

# STEADY-STATE SIMULATION OF GROUND- WATER FLOW IN THE BLAINE AQUIFER, SOUTHWESTERN OKLAHOMA AND NORTHWESTERN TEXAS

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By D.L. RUNKLE and J.S. McLEAN

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**For additional information  
write to:  
District Chief  
U.S. Geological Survey  
Water Resources Division  
202 NW 66th Street, Building 7  
Oklahoma City, OK 73116**

**Copies of this report can be  
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## DISKETTE [In pocket inside back cover]

MODFLOW package inputs and data arrays—ASCII

## CONVERSION FACTORS AND VERTICAL DATUM

<b>Multiply</b>	<b>By</b>	<b>To obtain</b>
acre	4,047	meter squared
acre-foot	1,233	cubic meter
cubic foot per second (ft <sup>3</sup> /s)	0.02832	cubic meter per second
foot per day (ft/d)	0.3048	meter per day
foot squared per day (ft <sup>2</sup> /d)	0.09290	meter squared per day
foot (ft)	0.3048	meter
inch (in.)	25.4	millimeter
mile (mi)	1.609	kilometer
square mile (mi <sup>2</sup> )	2.590	square kilometer

Degree Celsius (°C) may be converted to degree Fahrenheit (°F) by using the following equation:

$$^{\circ}\text{F} = 9/5 (^{\circ}\text{C}) + 32.$$

Degree Fahrenheit (°F) may be converted to degree Celsius (°C) by using the following equation:

$$^{\circ}\text{C} = 5/9 (^{\circ}\text{F}-32).$$

**Sea level:** In this report “sea level” refers to the National Geodetic Vertical Datum of 1929 (NGVD of 1929)— a geodetic datum derived from a general adjustment of the first-order level nets of both the United States and Canada, formerly called Sea Level Datum of 1929.

# Steady-State Simulation of Ground-Water Flow in the Blaine Aquifer, Southwestern Oklahoma and Northwestern Texas

By D.L. Runkle and J.S. McLean

## Abstract

A generalized finite-difference ground-water flow model was prepared for the Blaine aquifer in southwestern Oklahoma and northwestern Texas. This report releases the model for use and modification. A grid of 1-square-mile nodes was established over the area, with 1,030 of the nodes actively simulated in the model. The steady-state model simulation used an average recharge rate of 1.5 inches per year and three values of hydraulic conductivity: 71, 17, and 4.2 feet per day. About 29 percent of the simulated recharge was discharged as pumpage from wells, and the remainder was discharged to rivers and creeks within and adjacent to the study area.

## INTRODUCTION

Irrigators in southwestern Oklahoma and northwestern Texas rely on the cavernous Blaine aquifer to supply water for the irrigation of about 200,000 acres. The Oklahoma Water Resources Board requires information on the ability of the aquifer to sustain this development. To define ground-water flow in the aquifer, the U.S. Geological Survey, in cooperation with the Oklahoma Water Resources Board and the Oklahoma Geological Survey, began a study of the hydrology of the Blaine aquifer in 1986.

## Purpose and Scope

The purpose of this report is to present a simplified conceptual model of the ground-water hydrology of the Blaine aquifer, to test the conceptual model using a numerical model of ground-water flow, and to make the numerical model available for use and improvement by the cooperators and other interested parties.

## Location of the Study Area

The study area includes the most productive parts of the Blaine aquifer in southwestern Oklahoma and northeastern Texas (fig. 1), an area of approximately 4,400 mi<sup>2</sup>. The study area includes all or part of Harmon, Jackson, and Greer Counties in Oklahoma; and all or part of Hardeman, Collingsworth, and Childress Counties in Texas (fig. 2).

## General Geology

The Blaine Formation is of Permian (Guadalupian) age. It consists mostly of massive beds of gypsum and anhydrite, with lesser thicknesses of dolomite and shale. Within the study area, the Blaine Formation reaches a maximum total thickness of 215 feet. It dips to the southeast at about 5 to 45 feet per mile, and thins toward the erosional limit in the east.

The Blaine Formation is underlain by the Flowertop Shale, which consists of reddish-brown shale with thin interbeds of gypsum, dolomite, siltstone, sandstone, and greenish-gray shale. The upper part of the formation contains several hundred feet of rock salt and salty shale in the western part of the study area (Steele and Barclay, 1965). The Dog Creek Shale, overlying the Blaine Formation, consists of a thick sequence of reddish-brown shales containing thin interbeds of gypsum, dolomite, and, in the lower part, greenish-gray shale. The gypsum and dolomite beds are mainly in the lower 60 feet of the Dog Creek Shale and are generally much thinner than those in the Blaine Formation; thus the Dog Creek is considered to be a shale formation where more than 60 feet thick.

## HYDROLOGY

The Blaine aquifer, for the purposes of this report, consists of the Blaine Formation. The Blaine

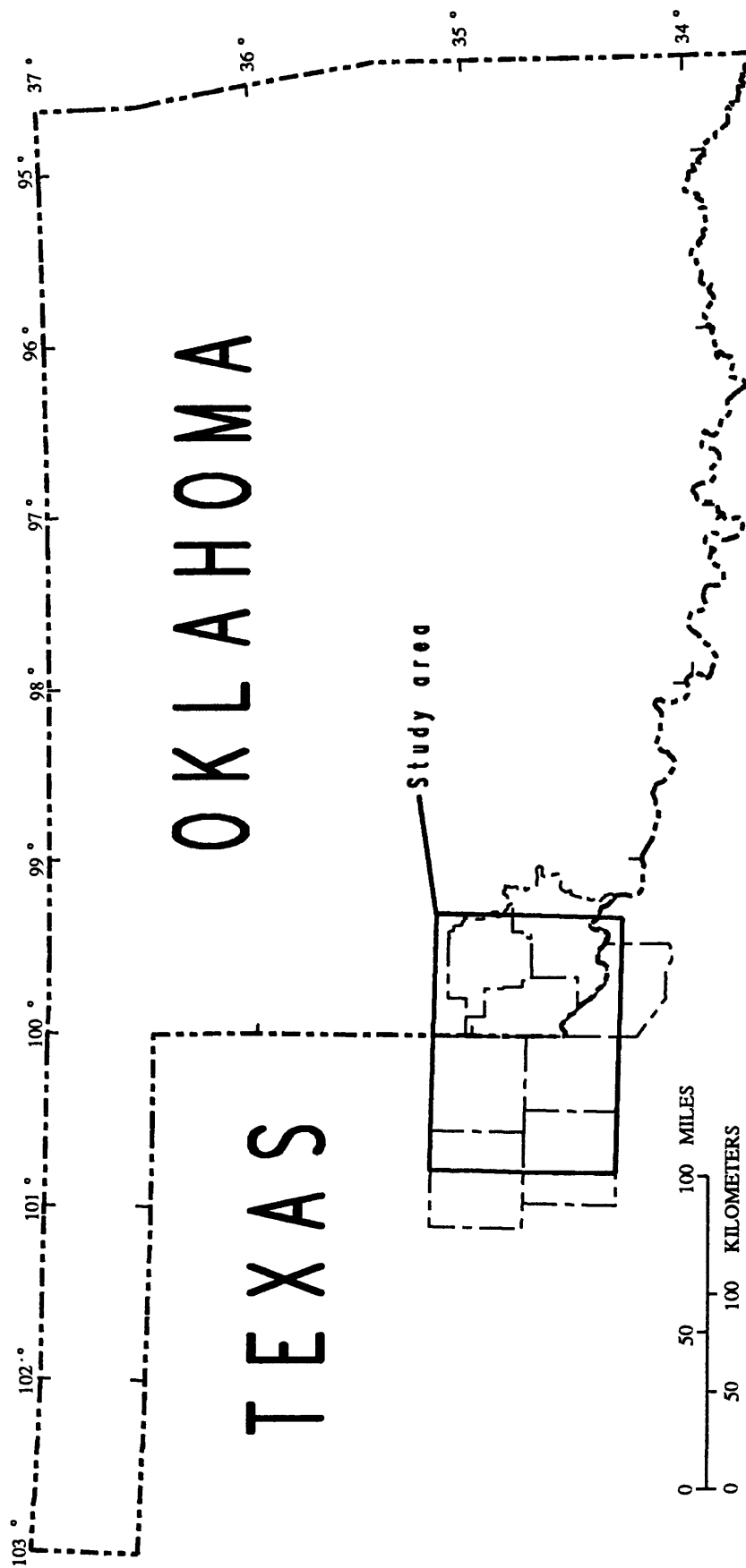


Figure 1. Location of the study area.

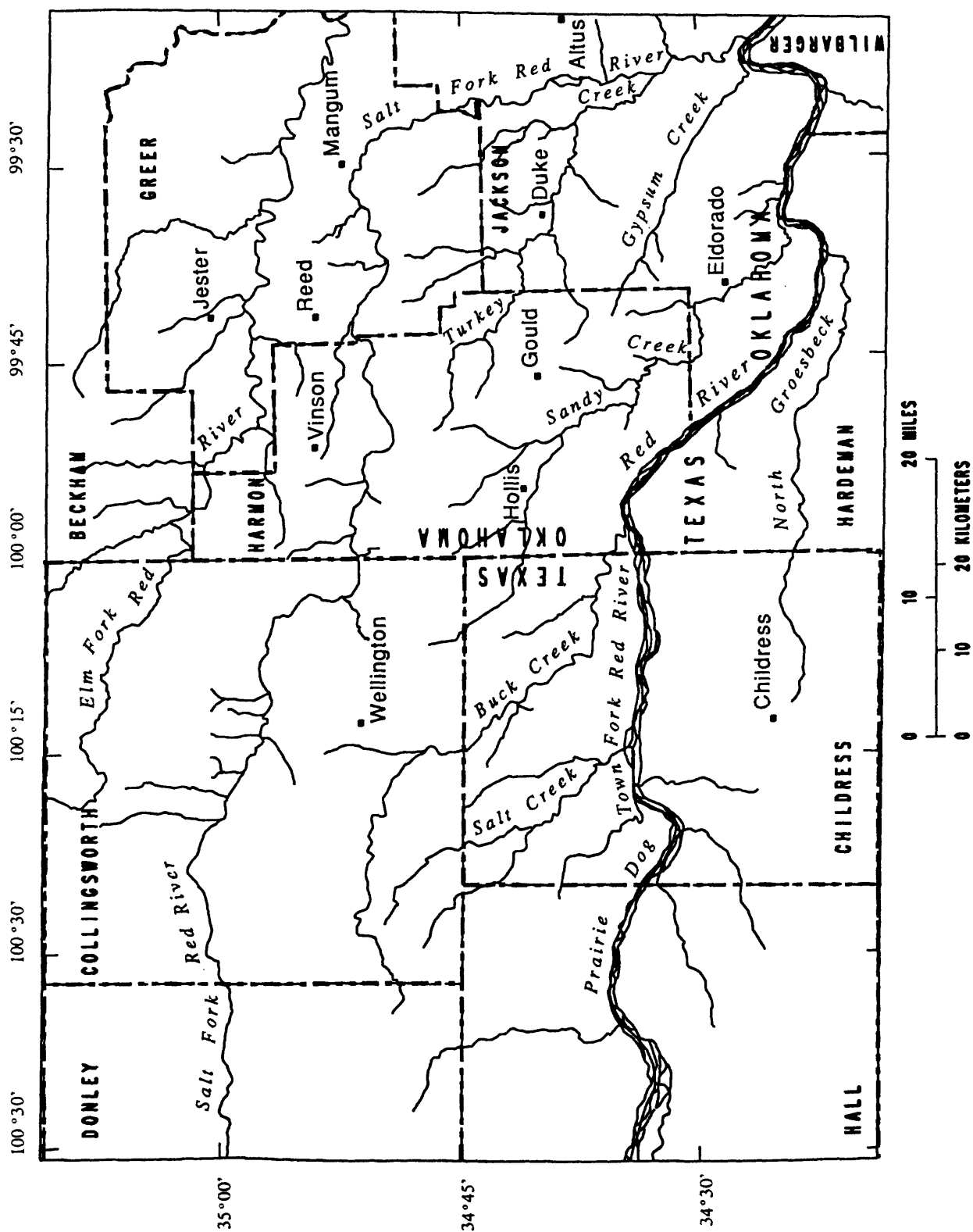


Figure 2. Geographic features of the study area.

aquifer is a karst aquifer, created by the hydration of anhydrite to gypsum and the dissolution of gypsum along fractures and bedding planes. This dissolution has resulted in solution openings as large as 5 feet in diameter. The hydraulic conductivity of the aquifer therefore is variable over short distances, depending on the size, degree of interconnection, and number of solution openings present.

The dissolution of gypsum that enhances the hydraulic conductivity of the Blaine aquifer is greatest where the overlying Dog Creek Shale is thin (less than 60 feet thick) or absent. Thus, the average hydraulic conductivity of the aquifer is greatest in these areas, and is least in areas where the thickness of the Dog Creek Shale is 60 feet or more. Steele and Barclay (1965) evaluated water-level changes in the vicinity of pumping centers and estimated that the average transmissivity ranged from about 16,000 ft<sup>2</sup>/d (feet squared per day) to about 61,000 ft<sup>2</sup>/d.

The Blaine aquifer is recharged by direct infiltration of precipitation and by flow into the aquifer from sinking streams losing water to near-surface fractures and solution openings. Recharge also occurs through sinkholes and recharge wells. The recharge is greatest where the overlying Dog Creek Shale is less than 60 feet thick. Elsewhere, a much smaller amount of recharge may occur as leakage through the Dog Creek Shale. Steele and Barclay (1965) used several water-budget methods to estimate that between 5 and 7.8 percent of the normal annual precipitation of 24 inches recharges the aquifer.

Water in the aquifer moves generally southeast (fig. 3) with local movement towards streams, where ground-water discharges. Figure 3 is a general ground-water altitude map of the Blaine aquifer based on water-level measurements from selected wells in February 1988 and on the altitudes of flowing streams believed to be in hydraulic connection with the aquifer.

Water is removed from the aquifer by pumping wells or discharges by seepage to streams in hydraulic connection with the aquifer. Water also is discharged by evaporation and transpiration from riparian vegetation, although evaporation and transpiration were negligible during February 1988 when the water level and streamflow measurements were made. This component of the water budget and a corresponding amount of recharge were therefore neglected in the evaluation of the hydrology of the area. An estimated 23,555.3 acre-feet of water (Oklahoma Water Resources Board, written commun., 1994) was pumped from the aquifer

in 1987, mostly for irrigation. Principal streams in the area receiving ground-water discharge are Buck Creek, Turkey Creek, Gypsum Creek, and Sandy (Lebos) Creek, as well as some reaches of the Red River and the Salt Fork of the Red River. Base-flow measurements were made on these streams to provide information on ground-water discharge. The total gain in base flow of these streams was about 57 ft<sup>3</sup>/s (cubic feet per second) in February 1988.

## MODEL DESCRIPTION

A simplified, steady-state model of the Blaine aquifer was prepared to evaluate average conditions in the aquifer and to test concepts of ground-water flow in the system. The area was divided into model nodes, representing 1-square-mile segments of the aquifer (fig. 4). A total of 43 rows and 47 columns of nodes were used. Of the 2,021 square miles represented by this model grid, only 1,030 square miles are represented by active nodes. The area simulated is bounded on the north by the Salt Fork of the Red River, on the east by the erosional boundary of the aquifer, on the south by the Red River, and on the west by Buck Creek and a ground-water divide north of Buck Creek. The area includes the communities of Hollis, Vinson, Reed, Duke, Eldorado, and Wellington.

The finite-difference modular model code of McDonald and Harbaugh (1988) was used in the simulation. The results of the simulation are shown in Attachments A and B, at the end of this report. The modular model uses consistent units in simulations. The units of length used in this simulation are feet and the units of time are days. The reader needs to refer to the model documentation (McDonald and Harbaugh, 1988) when interpreting this attachment. The simulation was evaluated using the Modular Model Statistical Program (MMSP) of Scott (1990). These results are shown in Attachment B.

Hydraulic conductivity values for the aquifer initially were distributed into two zones based on the thickness of the overlying Dog Creek Shale. Where the shale was 60 feet or more in thickness, a value of 4.2 ft/d (feet per day) was used and where the shale was less than 60 feet thick, a larger value of hydraulic conductivity was used. The area of large hydraulic conductivity later was subdivided into two zones of 17 and 71 ft/d during model adjustments.



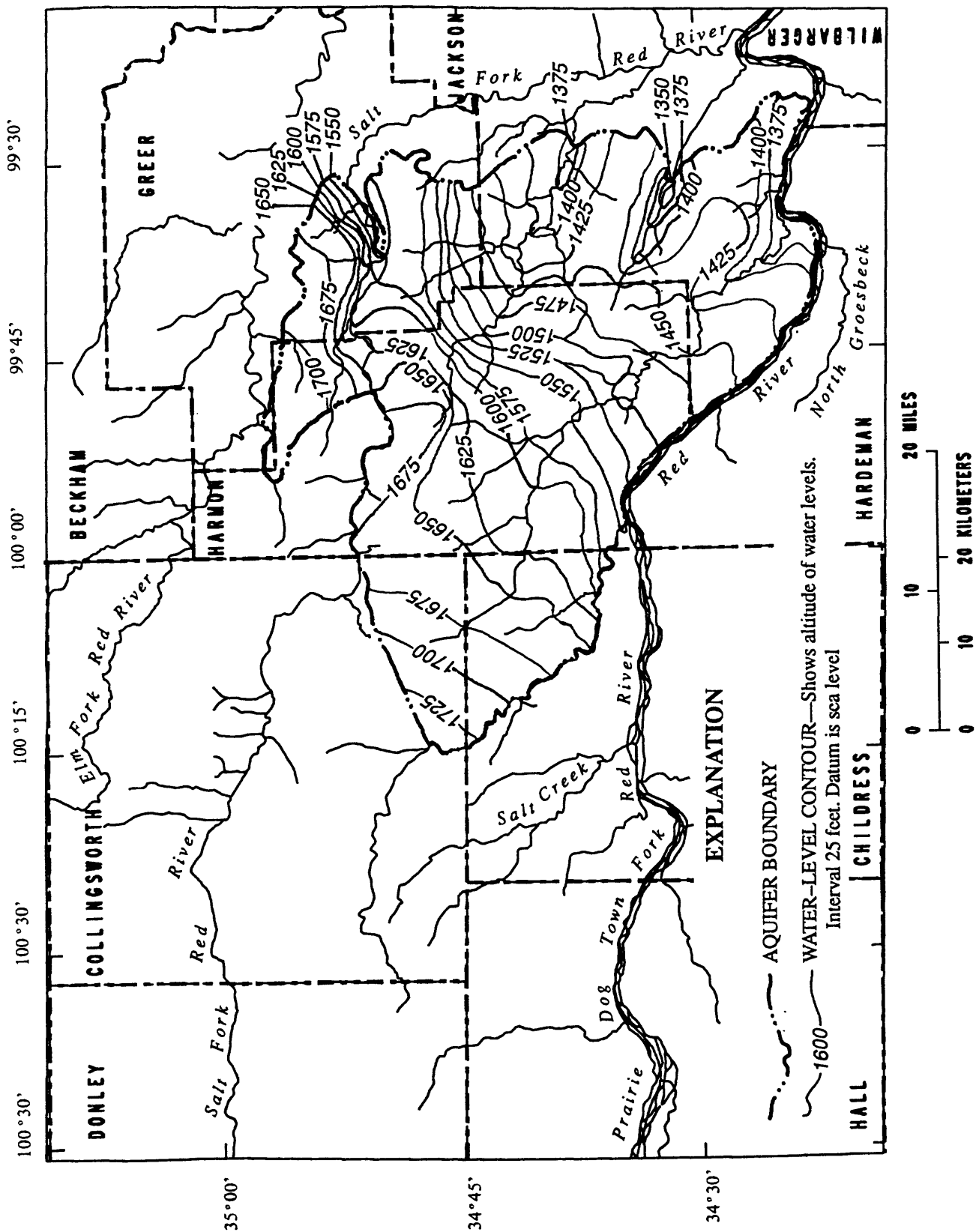


Figure 3. Altitude of water levels in the Blaine aquifer, February 1988.

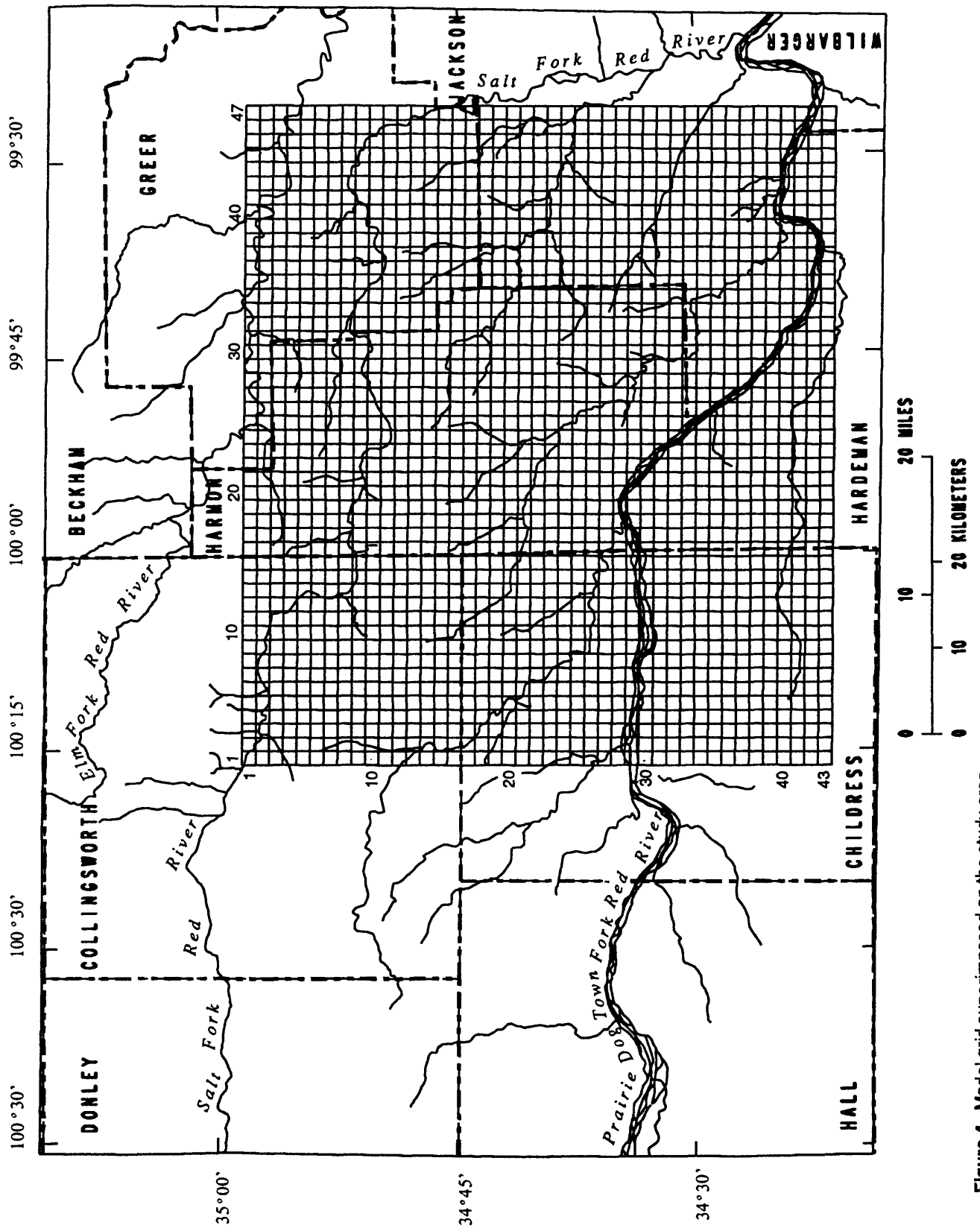


Figure 4. Model grid superimposed on the study area.

## Boundary Conditions

The model grid and boundary conditions are shown in figure 5. The active area of the model is bounded implicitly by a no-flow boundary. The eastern and northeastern boundaries are the limits of saturation in the aquifer, near the physical limit of the aquifer. The southern boundary coincides with the Red River, and is represented by river nodes. The southwestern boundary representing Buck Creek is simulated using drains. The northwestern boundary is poorly defined. However, because hydraulic conductivity in the Blaine aquifer decreases as the depth of burial increases to the west this boundary was represented as a no-flow boundary. Interior boundaries include part of the Salt Fork of the Red River and Gypsum, Turkey, and Sandy Creeks, each represented by drains. The widespread use of drains, rather than river nodes, allows possible simulated dewatering of these streams as a result of simulated pumpage.

The base of the aquifer is the Flowerpot Shale, which, because of its small hydraulic conductivity and saline water content, is considered to be a no-flow boundary. The top of the Blaine aquifer is either the land surface, where the aquifer is not confined, or the base of the overlying Dog Creek Shale. The data arrays representing the altitudes of the tops of the Flowerpot Shale and the Blaine aquifer are listed in Attachment A.

## Recharge

An initial estimate of recharge was made by assuming that the system was in dynamic equilibrium, so that recharge was approximately equal to discharge. Recharge then was estimated by summing all (measured and estimated) streamflow gains in the area for February 1988. It was assumed that this initial estimate of about  $140 \text{ ft}^3/\text{s}$  would represent the sum of direct recharge from precipitation and infiltration from small streams.

The model was developed to simulate the base flow of streams and water levels in wells during February 1988, and therefore can be assumed to represent diffuse ground-water flow through small fractures and solution cavities in the aquifer. However, during storms, runoff enters large conduits in the upper part of the system, and water levels rise to occupy conduits in the parts of the aquifer that are dry during the low-flow

periods. The model is not intended to represent these large flows in discrete conduits.

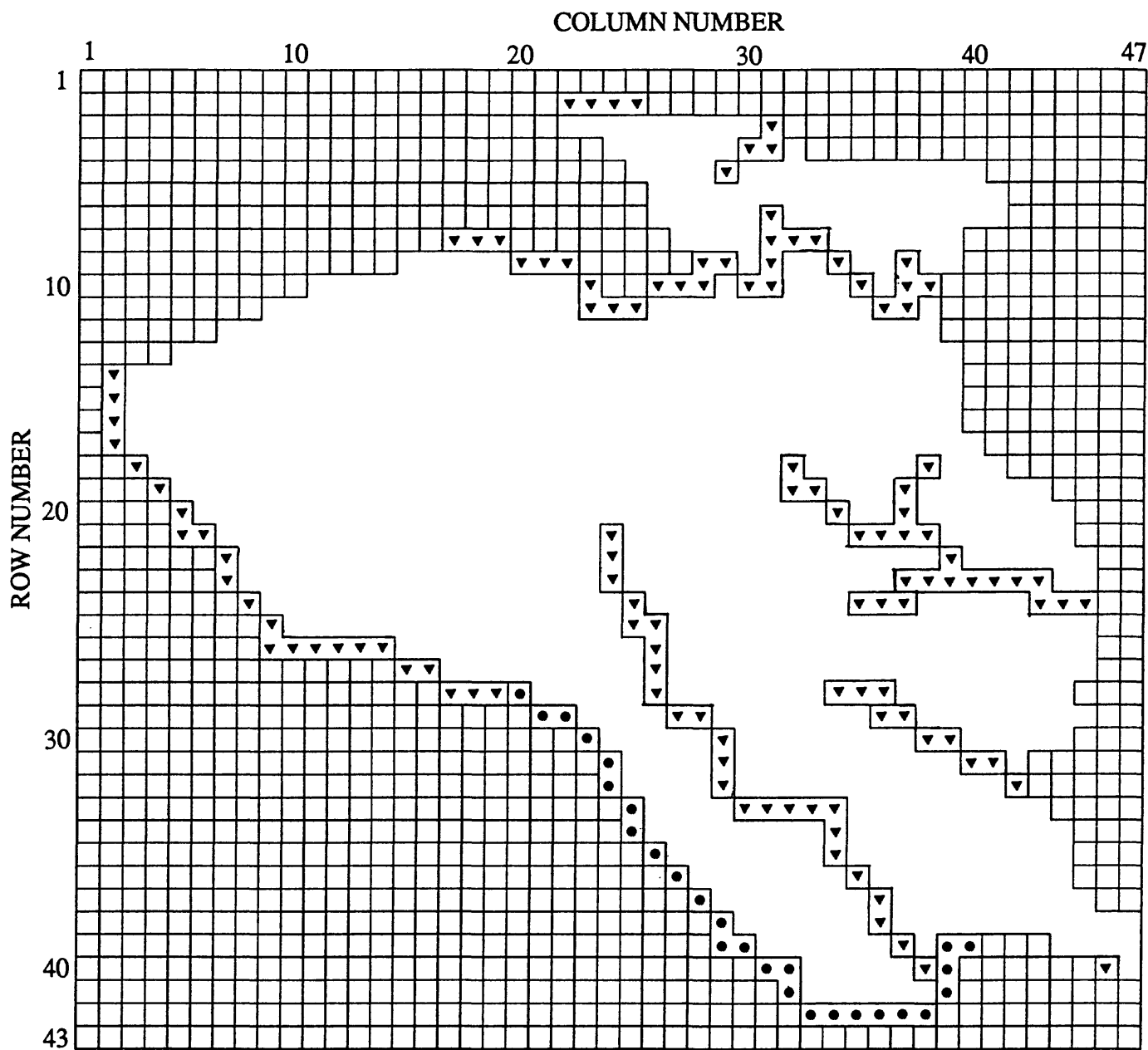
## Discharge

Water is discharged from the aquifer as seepage to internal rivers and creeks, as seepage to peripheral rivers and creeks, and as pumpage from wells. The peripheral rivers and creeks can gain water from sources outside the simulated area, so only the internal reaches of rivers and creeks were used for the model adjustments. The streambed altitudes and conductances of rivers and creeks simulated as drains are listed in Attachment A. The stream altitudes, streambed altitudes, and streambed conductances for rivers likewise are listed in Attachment A. Discharge simulated from nodes representing the internal drains was summarized using the program ZONEBUDGET (Harbaugh, 1990). This program summarizes the flow terms for specified zones within the model. The simulation results for these and other nodes, as summarized by ZONEBUDGET, are listed in Attachment C.

Wells in the area are reported to have discharged 23,555.3 acre-feet of water in 1987, mostly for irrigation (Oklahoma Water Resources Board, written commun., 1994). This discharge of  $32.53 \text{ ft}^3/\text{s}$  was simulated by applying pumpage uniformly to the areas shown as irrigation areas on Plates 1 through 6 of Steele and Barclay (1965). An assumed pumping rate of  $8,195 \text{ ft}^3/\text{d}$  for each of the 343 nodes representing irrigation areas resulted in a discharge of  $2.8 \times 10^6 \text{ ft}^3/\text{d}$ , equivalent to  $32.53 \text{ ft}^3/\text{s}$ , or 23,550 acre-feet per year. The nodes and pumping rates are listed in Attachment A.

## STEADY-STATE SIMULATION

A steady-state simulation of the Blaine aquifer was performed by adjusting hydraulic conductivity, conductance of streams and drains, and areal recharge to minimize the difference between measured and simulated water levels and between measured and simulated total discharge to internal rivers and creeks. Implicit in the simulation is the assumption that the aquifer is in a state of long-term dynamic equilibrium, for which a steady-state simulation of the water levels and streamflow gains in February 1988 is a reasonable approximation. This assumption is supported by long-



### EXPLANATION

- ▼ DRAIN NODES—Used to simulate small streams
- RIVER NODES—Used to simulate the Red River
- INACTIVE NODES

Figure 5. Model boundaries.

term water levels in the area (Blazs and others, 1993) that show no systematic decline, and thus no long-term decrease in storage.

## Model Adjustments

Initial model simulations indicated that saturation consistently was reduced to zero in an area represented by the northeast part of the model. After re-examining well data in the area, it was concluded that saturation in the area was thin and discontinuous, so nodes representing that area were made inactive. Simulations also indicated unsaturated conditions within the irrigation areas. Pumpage was eliminated from these nodes, based on the assumption that irrigation is not continuous or uniform within the irrigation areas, and that the small hydraulic conductivities in these areas, which caused the nodes to go dry, are more likely to be correct than the pumpage.

Simulations using a uniform hydraulic conductivity for the zone of large hydraulic conductivity were unable to reproduce the difference in gradients between the northeast and northwest parts of the model, so the zone was subdivided, and the hydraulic conductivity in the northeast reduced, as indicated by the hydraulic conductivity array in Attachment A. The hydraulic conductivity and the net recharge rate were adjusted until a reasonable agreement between measured and simulated heads and between measured and simulated total discharge to interior drains was achieved.

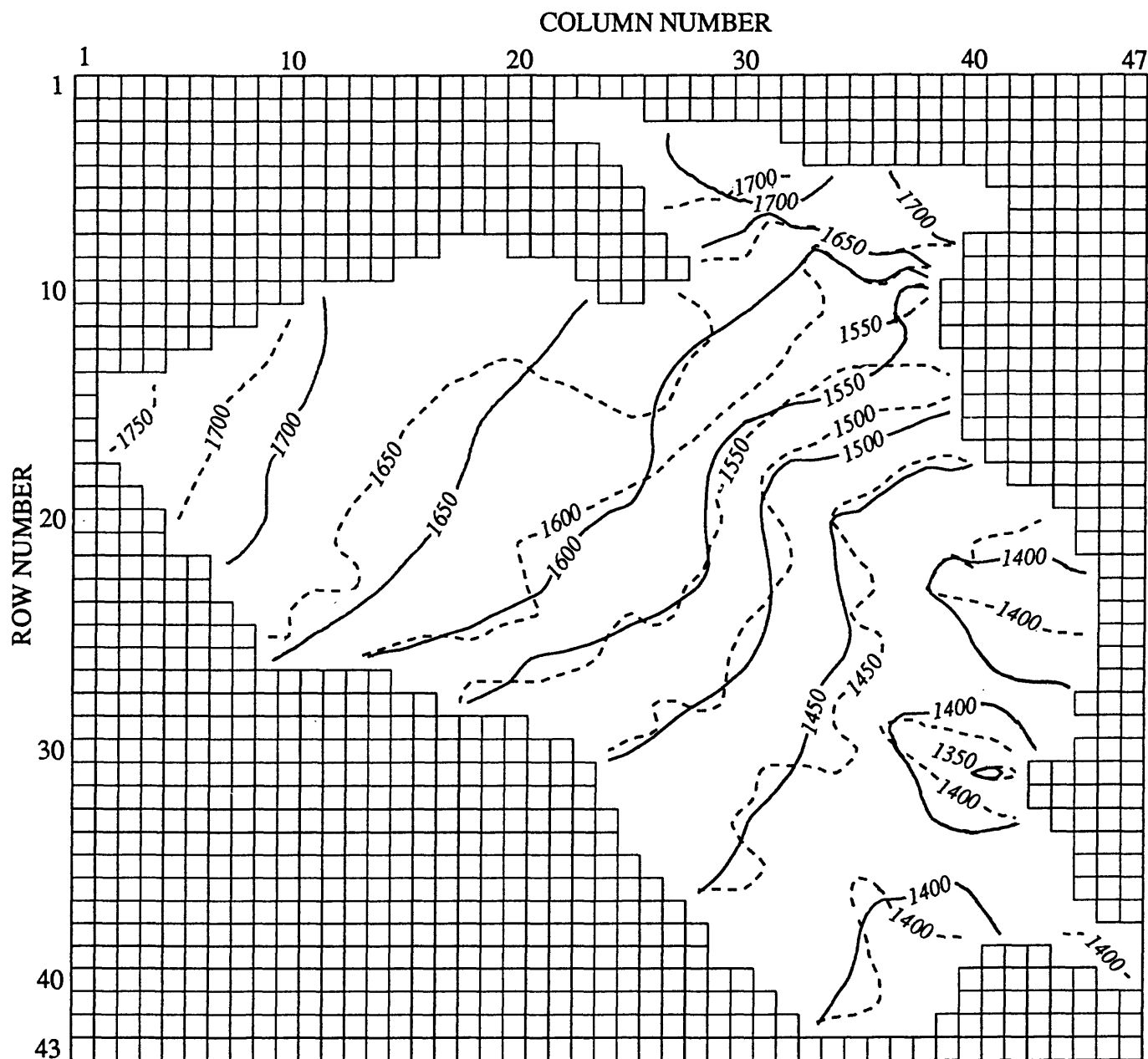
The initial recharge estimate of about  $140 \text{ ft}^3/\text{s}$  was modified during model adjustments. Overall recharge was adjusted simultaneously with hydraulic conductivity so that the simulated discharge of streams was maintained as the agreement between measured and simulated water levels was improved. The resulting recharge estimate of  $5.8 \times 10^{-4} \text{ ft/d}$  was applied uniformly to the area of the model that represents the area in which the aquifer is overlain by less than 60 feet of Dog Creek Shale. A smaller component of recharge,  $2.32 \times 10^{-5} \text{ ft/d}$ , was applied to the remaining model nodes representing areas overlain by 60 feet or more of Dog Creek Shale, to simulate leakage through the shale, as listed in Attachment A. The resulting adjusted rate of recharge was  $113 \text{ ft}^3/\text{s}$ .

## Simulation Results

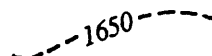
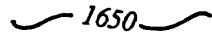
The error at each node in the model is defined as the difference between the measured and simulated water levels. The average error for the 1,030 active nodes in the model was 4.39 feet, the average absolute error (the average of the errors for all active nodes, regardless of sign) was 13.5 feet, and the standard deviation of the error was 18.3 feet. Measured and simulated water levels are shown on figure 6. The largest differences between measured (or interpolated) water levels and simulated water levels occur in the north-central part of the model, in an area with little well control. Large errors also are present in the extreme northeast part of the model and in the southeast corner; however, there are no wells in these areas. Thus, additional effort in improving the agreement in these areas would be unproductive.

The net simulated recharge of  $113 \text{ ft}^3/\text{s}$  is balanced by well pumpage of  $32.5 \text{ ft}^3/\text{s}$  (29 percent), discharge to small streams and creeks of  $65 \text{ ft}^3/\text{s}$  (58 percent) and discharge to the main stem of the Red River of about  $15 \text{ ft}^3/\text{s}$  (13 percent). The recharge rate of  $113 \text{ ft}^3/\text{s}$  over the area of the active nodes ( $1,030 \text{ mi}^2$ ) produces an average recharge rate of 0.12 foot, or about 1.5 inches, per year. This is 6.3 percent of the average of 24 inches per year of precipitation in the area, within the range of 5 to 7.8 percent estimated by Steele and Barclay (1965, p. 2).

Measured and simulated ground-water discharge to rivers and creeks are shown in table 1. The measured and simulated discharges are in general agreement; however, the model simulates too much of the discharge moving to Sandy Creek, Buck Creek, and a reach of the Red River, and not enough moving to Turkey and Gypsum Creeks. Varying the conductances of streams and drains was insufficient to correct the imbalance in discharges. This could be due to errors in the assigned distributions of hydraulic conductivity, pumping within or between the irrigation areas, or recharge. Insufficient simulated flows in Gypsum Creek may be due to an error in the extent of the zone of lesser hydraulic conductivity in the easternmost simulated reach of the creek. Because the Blaine aquifer is a karst aquifer, large local variations in the hydraulic conductivity and recharge (due to sinking streams) are likely. The kind of detailed analysis needed to evaluate the possible errors and make the necessary modifications is beyond the scope of this simplified model analysis.



### EXPLANATION

- 
**WATER-LEVEL CONTOUR**—Shows altitude of February 1988 water levels interpolated from measured water levels. Interval 50 feet
- 
**SIMULATED WATER-LEVEL CONTOUR**—Shows altitude of simulated water level. Interval 50 feet

**Figure 6.** Measured and simulated water levels in the Blaine aquifer.

**Table 1.** Measured and simulated discharge to rivers and creeks  
[ft<sup>3</sup>/s, cubic feet per second]

Stream	Measured, February 1988 (ft <sup>3</sup> /s)	Simulated (ft <sup>3</sup> /s)	Zone in Attachment B
Buck Creek	12.2	15.5	2
Salt Fork of the Red River	3.1	4.1	5
Turkey Creek	26.7	18.3	6
Sandy Creek	15.9	20.1	7
Gypsum Creek	8.5	7.1	8
Red River	6.9	9.1	9
Total	73.3	74.2	

The values of hydraulic conductivity for the simulation were 71 ft/d in the zone of greatest hydraulic conductivity and 17 ft/d in parts of the northeastern part of the area. Where the full thickness of the Blaine aquifer is present, about 200 feet, this would be equivalent to transmissivities of about 14,000 ft<sup>2</sup>/d and 3,400 ft<sup>2</sup>/d. These values are considerably less than the values of 61,000 to 16,000 ft<sup>2</sup>/d derived from analysis of pumping centers by Steele and Barclay (1965), suggesting that local areas of greater transmissivity are imbedded in regions with a smaller effective transmissivity. This is consistent with the observed heterogeneity of karst systems.

## SUMMARY AND CONCLUSIONS

A simplified simulation of the Blaine aquifer indicates that the hydraulic conductivity generally is greater in the west and central parts of the area than in the northeast part of the area. The simulation was produced based on the assumption that the hydraulic conductivity in the areas where the aquifer is overlain by more than 60 feet of Dog Creek Shale is substantially less than elsewhere. However, because of the paucity of water-level data in areas where the aquifer is deeply buried in the north and northwest, little confidence can

be placed in the closely related estimates of leakage and hydraulic conductivity in these areas.

The model reasonably simulates the base flow of streams and water levels in wells during February 1988, and therefore can be assumed to represent diffuse ground-water flow through small fractures and solution cavities in the aquifer. During periods of large rainfall, storm runoff enters large conduits in the shallow part of the system, and water levels rise to occupy conduits in the parts of the aquifer that are dry during low-flow periods. The model cannot represent these large flows in discrete conduits, and therefore should not be expected to simulate high-flow conditions.

Variations in the conductances of streams and drains are insufficient in themselves to account for the excess simulated discharge in drains such as that representing Sandy Creek. Additional information is needed to account for the excess. Insufficient simulated flows in Gypsum Creek may be due to an error in the extent of the zone of lesser hydraulic conductivity in the easternmost simulated reach of the creek.

This report releases the ground-water flow model for use and modification. Additional data could be collected, or existing data used, to provide additional tests and refinements. The simplified simulation in this report presents only the general features of the ground-water system. Useful refinements would include improved estimates of the rate and distribution of pumpage and recharge, improved understanding of the hydraulic conductivity of deeply buried parts of the Blaine aquifer, local variations in the hydraulic conductivity, and rates of leakage from the Dog Creek Shale. Additional improvements in the understanding of the system could be achieved by conducting transient simulations on a seasonal or long-term basis. Attention needs to be given to boundary conditions in the model to ensure that they remain valid as other characteristics of the model are changed.

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- Scott, J.C., 1990, A statistical processor for analyzing simulations made using the modular finite-difference ground-water flow model: U.S. Geological Survey Water-Resources Investigations Report 89-4159, 218 p.
- Steele, C.E., and Barclay, J.E., 1965, Ground-water resources of Harmon County and adjacent parts of Greer and Jackson Counties, Oklahoma: Oklahoma Water Resources Board Bulletin 29, 65 p., 8 figs., 7 plates.



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## ATTACHMENTS

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# ATTACHMENT A. MODULAR MODEL RESULTS FOR A STEADY-STATE SIMULATION OF GROUND-WATER FLOW IN THE BLAINE AQUIFER, SOUTHWESTERN OKLAHOMA AND NORTHWESTERN TEXAS

## U.S. GEOLOGICAL SURVEY MODULAR FINITE-DIFFERENCE GROUND-WATER MODEL

BLAINE, 1N1AY, 43NROW, 47NCOL

1 LAYERS 43 ROWS 47 COLUMNS

1 STRESS PERIOD(S) IN SIMULATION

MODEL TIME UNIT IS DAYS

I/O UNITS:

ELEMENT OF IUNIT: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24  
I/O UNIT: 60 67 65 66 0 0 0 62 63 0 0 64 0 0 0 0 0 0 0 0 0 0 0 0

BAS1 -- BASIC MODEL PACKAGE, VERSION 1, 9/1/87 INPUT READ FROM UNIT 5  
ARRAYS RHS AND BUFF WILL SHARE MEMORY.

START HEAD WILL BE SAVED

18283 ELEMENTS IN X ARRAY ARE USED BY BAS

18283 ELEMENTS OF X ARRAY USED OUT OF 100000

BCF1 -- BLOCK-CENTERED FLOW PACKAGE, VERSION 1, 9/1/87 INPUT READ FROM UNIT 60  
STEADY-STATE SIMULATION

CELL-BY-CELL FLOWS WILL BE RECORDED ON UNIT 30

LAYER AQUIFER TYPE

1 3

6064 ELEMENTS IN X ARRAY ARE USED BY BCF

24347 ELEMENTS OF X ARRAY USED OUT OF 100000

WELL1 -- WELL PACKAGE, VERSION 1, 9/1/87 INPUT READ FROM 67  
MAXIMUM OF 343 WELLS

CELL-BY-CELL FLOWS WILL BE RECORDED ON UNIT 30

1372 ELEMENTS IN X ARRAY ARE USED FOR WELLS

25719 ELEMENTS OF X ARRAY USED OUT OF 100000

DRN1 -- DRAIN PACKAGE, VERSION 1, 9/1/87 INPUT READ FROM UNIT 65  
MAXIMUM OF 123 DRAINS

CELL-BY-CELL FLOWS WILL BE RECORDED ON UNIT 30

615 ELEMENTS IN X ARRAY ARE USED FOR DRAINS

26334 ELEMENTS OF X ARRAY USED OUT OF 100000

RCH1 -- RECHARGE PACKAGE, VERSION 1, 9/1/87 INPUT READ FROM UNIT 62  
OPTION 3 -- RECHARGE TO HIGHEST ACTIVE NODE IN EACH VERTICAL COLUMN

RIV1 -- RIVER PACKAGE, VERSION 1, 9/1/87 INPUT READ FROM UNIT 66  
MAXIMUM OF 27 RIVER NODES

CELL-BY-CELL FLOWS WILL BE RECORDED ON UNIT 30  
162 ELEMENTS IN X ARRAY ARE USED FOR RIVERS  
28517 ELEMENTS OF X ARRAY USED OUT OF 100000

SIPI -- STRONGLY IMPLICIT PROCEDURE SOLUTION PACKAGE, VERSION 1, 9/1/87 INPUT READ FROM UNIT 63  
MAXIMUM OF 50 ITERATIONS ALLOWED FOR CLOSURE

## 5 ITERATION PARAMETERS

8289 ELEMENTS IN X ARRAY ARE USED BY SIP  
36806 ELEMENTS OF X ARRAY USED OUT OF 100000

BLAINE, 1N1AY, 43NROW, 47NCOL

**BCF, RCH, SIP, OC**

BOUNDARY ARRAY FOR LAYER 1 WILL BE READ ON UNIT 53 USING FORMAT: (47I2)

[illegible]

Attachment A 17

[illegible]







1630. 1630. 1625. 1625. 1620. 1615. 1605. 1585. 1560. 1535. 1520. 1510. 1500. 1485. 1475. 1460. 1470. 1470. 1475.

1475. 0. 0. 0. 0. 0. 0.

17 0. 1750. 1740. 1730. 1717. 1705. 1695. 1685. 1680. 1675. 1670. 1665. 1660. 1655. 1647. 1645. 1640. 1630. 1625. 1625.

1620. 1615. 1615. 1610. 1610. 1600. 1585. 1560. 1535. 1515. 1500. 1495. 1480. 1475. 1465. 1460. 1455. 1455. 1460.

1460. 0. 0. 0. 0. 0. 0.

18 0. 0. 1740. 1725. 1710. 1700. 1690. 1685. 1680. 1675. 1668. 1665. 1663. 1650. 1640. 1630. 1620. 1615. 1615. 1615.

1610. 1610. 1610. 1605. 1605. 1600. 1585. 1570. 1555. 1520. 1495. 1480. 1475. 1470. 1460. 1455. 1440. 1430. 1440.

1430. 1430. 0. 0. 0. 0. 0.

19 0. 0. 0. 1720. 1705. 1695. 1685. 1680. 1675. 1670. 1665. 1660. 1650. 1640. 1630. 1620. 1615. 1610. 1610. 1605.

1605. 1605. 1605. 1600. 1595. 1590. 1575. 1565. 1545. 1520. 1495. 1475. 1465. 1455. 1450. 1445. 1425. 1435. 1430.

1430. 1430. 1430. 0. 0. 0. 0.

20 0. 0. 0. 0. 1700. 1690. 1685. 1680. 1670. 1665. 1660. 1652. 1645. 1635. 1630. 1620. 1620. 1615. 1610. 1605.

1605. 1600. 1595. 1590. 1585. 1580. 1575. 1565. 1550. 1525. 1510. 1490. 1465. 1445. 1435. 1425. 1415. 1425. 1415.

1410. 1410. 1400. 1400. 0. 0. 0.

21 0. 0. 0. 0. 1690. 1685. 1675. 1670. 1665. 1660. 1655. 1650. 1645. 1635. 1630. 1620. 1615. 1610. 1605. 1600.

1595. 1585. 1580. 1575. 1570. 1565. 1560. 1555. 1545. 1530. 1510. 1500. 1480. 1465. 1435. 1415. 1407. 1400. 1405. 1400.

1395. 1390. 1390. 1385. 0. 0. 0.

22 0. 0. 0. 0. 0. 0. 1675. 1670. 1665. 1660. 1652. 1650. 1640. 1630. 1625. 1620. 1615. 1610. 1605. 1605.

1585. 1580. 1575. 1567. 1565. 1560. 1555. 1555. 1535. 1525. 1515. 1500. 1480. 1465. 1455. 1440. 1420. 1405. 1395. 1400.

1390. 1390. 1395. 1380. 1375. 0. 0.

23 0. 0. 0. 0. 0. 0. 1670. 1665. 1660. 1655. 1650. 1650. 1645. 1635. 1630. 1625. 1620. 1615. 1610. 1610.

1590. 1575. 1565. 1559. 1560. 1555. 1555. 1540. 1525. 1515. 1505. 1485. 1480. 1465. 1460. 1445. 1410. 1400. 1390. 1385.

1380. 1370. 1365. 1370. 1375. 0. 0.

24 0. 0. 0. 0. 0. 0. 1660. 1655. 1650. 1645. 1635. 1630. 1625. 1620. 1615. 1610. 1610. 1605. 1605.

1600. 1575. 1565. 1560. 1550. 1565. 1550. 1540. 1525. 1505. 1495. 1485. 1480. 1460. 1445. 1435. 1420. 1420. 1415. 1415.

1405. 1400. 1360. 1355. 1355. 0. 0.

25 0. 0. 0. 0. 0. 0. 1650. 1650. 1645. 1630. 1615. 1615. 1605. 1600. 1600. 1605. 1595. 1590. 1590.

1580. 1570. 1555. 1550. 1544. 1538. 1540. 1525. 1515. 1495. 1490. 1480. 1470. 1460. 1455. 1450. 1440. 1435. 1430. 1425.

1425. 1420. 1415. 1405. 1400. 0. 0.

26 0. 0. 0. 0. 0. 0. 1640. 1640. 1625. 1615. 1600. 1590. 1585. 1580. 1575. 1575. 1575. 1570. 1570.

1565. 1560. 1555. 1545. 1540. 1532. 1530. 1520. 1505. 1490. 1475. 1470. 1465. 1455. 1450. 1440. 1435. 1430. 1430.

1430. 1425. 1420. 1415. 1415. 0. 0.

27 0. 0. 0. 0. 0. 0. 1530. 1525. 1520. 1510. 1505. 1480. 1470. 1465. 1460. 1455. 1450. 1445. 1440. 1435. 1430. 1430.

1550. 1545. 1540. 1535. 1530. 1525. 1520. 1510. 1505. 1480. 1470. 1465. 1460. 1455. 1450. 1445. 1440. 1435. 1430. 1430.

[illegible]

1400. 1400. 1400. 1400. 1400. 1400. 1400.

[illegible][illegible][illegible][illegible]

43

[illegible]

HEADS WILL BE SAVED ON UNIT 84      DRAWDOWNS WILL BE SAVED ON UNIT 82

OUTPUT CONTROL IS SPECIFIED EVERY TIME STEP

COLUMN TO ROW ANISOTROPY = 1.000000

DELIR = 5280.000

DELTA = 5280.000

HYD. COND. ALONG ROWS FOR LAYER 1 WILL BE READ ON UNIT 93 USING FORMAT: (47G4.0)

[illegible][illegible]

$\frac{0}{0}$









[illegible]



13 0. 0. 0. 0. 1570. 1560. 1540. 1520. 1500. 1490. 1480. 1470. 1460. 1450. 1440. 1430. 1420. 1410.  
1400. 1390. 1380. 1370. 1360. 1350. 1340. 1330. 1320. 1320. 1320. 1320. 1320. 1300. 1290. 1360. 1440. 1480. 1540.  
1570. 1580. 0. 0. 0. 0. 0. 0.

14 0. 1600. 1590. 1570. 1560. 1540. 1530. 1520. 1500. 1490. 1480. 1470. 1460. 1450. 1440. 1430. 1420. 1420. 1410.  
1400. 1390. 1380. 1370. 1360. 1340. 1330. 1320. 1300. 1290. 1290. 1280. 1270. 1260. 1260. 1280. 1340. 1380. 1520.  
1540. 1580. 0. 0. 0. 0. 0.

15 0. 1590. 1580. 1570. 1550. 1540. 1530. 1510. 1490. 1480. 1470. 1460. 1450. 1440. 1430. 1420. 1420. 1420. 1410.  
1400. 1390. 1380. 1370. 1360. 1340. 1330. 1320. 1310. 1300. 1290. 1280. 1270. 1260. 1260. 1260. 1300. 1400. 1500.  
1540. 1580. 0. 0. 0. 0. 0.

16 0. 1590. 1580. 1570. 1560. 1530. 1520. 1500. 1490. 1470. 1460. 1450. 1440. 1420. 1410. 1410. 1400. 1400. 1390.  
1380. 1370. 1360. 1350. 1340. 1330. 1320. 1310. 1300. 1290. 1280. 1270. 1260. 1260. 1280. 1300. 1400. 1520.  
1580. 0. 0. 0. 0. 0. 0.

17 0. 1590. 1580. 1560. 1550. 1540. 1520. 1500. 1490. 1470. 1460. 1450. 1440. 1430. 1420. 1400. 1390. 1380. 1380.  
1370. 1360. 1360. 1340. 1330. 1330. 1320. 1310. 1300. 1290. 1290. 1280. 1270. 1260. 1270. 1280. 1300. 1450.  
1540. 0. 0. 0. 0. 0. 0.

18 0. 0. 1580. 1560. 1550. 1530. 1520. 1500. 1490. 1470. 1460. 1450. 1440. 1420. 1270. 1260. 1260. 1300. 1360.  
1350. 1350. 1340. 1330. 1320. 1310. 1300. 1290. 1280. 1280. 1280. 1270. 1270. 1270. 1260. 1260. 1370. 1360.  
1420. 1460. 0. 0. 0. 0. 0.

19 0. 0. 0. 1570. 1550. 1540. 1520. 1500. 1490. 1480. 1470. 1460. 1450. 1430. 1410. 1390. 1390. 1370. 1360.  
1360. 1350. 1340. 1330. 1320. 1300. 1290. 1280. 1270. 1270. 1270. 1270. 1270. 1260. 1260. 1260. 1260. 1280.  
1300. 1340. 1380. 1440. 0. 0. 0.

20 0. 0. 0. 1580. 1560. 1550. 1530. 1520. 1500. 1490. 1480. 1470. 1460. 1440. 1420. 1410. 1400. 1400. 1390. 1380.  
1370. 1360. 1350. 1340. 1330. 1320. 1300. 1290. 1270. 1260. 1260. 1270. 1270. 1260. 1250. 1240. 1250. 1260.  
1280. 1290. 1300. 1360. 0. 0. 0.

21 0. 0. 0. 0. 1580. 1570. 1540. 1530. 1520. 1500. 1490. 1480. 1480. 1470. 1460. 1440. 1440. 1430. 1420. 1410.  
1400. 1380. 1380. 1370. 1360. 1340. 1310. 1290. 1270. 1260. 1260. 1270. 1260. 1250. 1240. 1240. 1240. 1240.  
1240. 1250. 1260. 1300. 0. 0. 0.

22 0. 0. 0. 0. 0. 0. 1560. 1550. 1540. 1520. 1500. 1490. 1480. 1470. 1460. 1460. 1450. 1440. 1430.  
1420. 1410. 1400. 1390. 1380. 1360. 1330. 1300. 1290. 1280. 1270. 1260. 1250. 1240. 1240. 1240. 1240.  
1240. 1250. 1260. 1280. 1340. 0. 0.

23 0. 0. 0. 0. 0. 0. 1580. 1570. 1560. 1540. 1530. 1510. 1500. 1490. 1480. 1480. 1470. 1460. 1450. 1450.  
1440. 1440. 1420. 1410. 1400. 1380. 1350. 1320. 1300. 1280. 1270. 1260. 1250. 1240. 1240. 1250. 1260.  
1260. 1260. 1270. 1280. 1310. 0. 0.

24 0. 0. 0. 0. 0. 0. 0. 1580. 1570. 1560. 1550. 1540. 1520. 1510. 1500. 1490. 1490. 1480. 1480. 1470.  
1460. 1450. 1440. 1420. 1410. 1390. 1360. 1340. 1320. 1290. 1280. 1270. 1260. 1250. 1240. 1270. 1280.

[illegible]



[illegible]

|        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 1673.4 | 1689.4 | 1674.8 | 1668.8 | 1579.9 | 1596.1 | 1614.8 | 1562.1 | 0.0    | 0.0    | 1676.5 | 1696.1 | 0.0    | 0.0    | 0.0    |
| 0.0    | 0.0    |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 11     | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 1723.2 | 1705.1 | 1693.1 | 1686.8 | 1681.8 | 1677.1 | 1672.0 |
| 1665.9 | 1650.5 | 1638.6 | 1629.6 | 1616.5 | 1602.8 | 1588.6 | 1574.0 | 1562.4 | 1555.4 | 1553.5 | 1555.8 | 1555.4 | 1603.8 | 1653.5 |
| 1659.7 | 1652.4 | 1644.7 | 1632.6 | 1597.4 | 1615.9 | 1598.0 | 1621.4 | 1644.7 | 1658.6 | 1686.4 | 1690.3 | 1675.6 | 0.0    | 0.0    |
| 0.0    | 0.0    |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 12     | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 1728.5 | 1712.3 | 1696.8 | 1688.7 | 1682.1 | 1678.1 | 1674.4 | 1670.2 |
| 1662.2 | 1644.6 | 1632.5 | 1622.7 | 1612.3 | 1601.2 | 1588.9 | 1574.3 | 1562.2 | 1555.5 | 1548.6 | 1539.7 | 1528.1 | 1527.5 | 1525.0 |
| 1535.1 | 1567.0 | 1561.5 | 1530.8 | 1520.0 | 1544.9 | 1619.8 | 1607.2 | 1637.8 | 1665.6 | 1676.3 | 1685.9 | 1675.7 | 0.0    | 0.0    |
| 0.0    | 0.0    |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 13     | 0.0    | 0.0    | 0.0    | 0.0    | 1761.1 | 1747.5 | 1732.7 | 1719.5 | 1690.4 | 1682.3 | 1676.4 | 1672.9 | 1670.8 | 1665.8 |
| 1657.8 | 1644.5 | 1631.0 | 1617.2 | 1607.1 | 1597.7 | 1586.8 | 1574.1 | 1562.3 | 1552.2 | 1539.4 | 1526.0 | 1518.0 | 1510.3 | 1505.5 |
| 1504.7 | 1504.4 | 1505.8 | 1498.7 | 1489.5 | 1485.6 | 1544.5 | 1610.9 | 1629.3 | 1652.8 | 1671.0 | 1663.4 | 0.0    | 0.0    | 0.0    |
| 0.0    | 0.0    |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 14     | 0.0    | 1795.7 | 1774.1 | 1761.9 | 1749.2 | 1735.5 | 1723.4 | 1711.1 | 1692.9 | 1684.4 | 1675.6 | 1668.2 | 1664.0 | 1661.2 |
| 1653.0 | 1643.8 | 1629.4 | 1619.1 | 1606.0 | 1599.2 | 1590.0 | 1577.6 | 1564.6 | 1551.8 | 1533.6 | 1522.2 | 1512.2 | 1496.1 | 1489.9 |
| 1487.1 | 1483.0 | 1475.1 | 1463.6 | 1445.7 | 1447.2 | 1495.5 | 1580.9 | 1613.1 | 1632.8 | 1662.6 | 1648.8 | 0.0    | 0.0    | 0.0    |
| 0.0    | 0.0    |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 15     | 0.0    | 1792.7 | 1769.4 | 1753.5 | 1739.7 | 1726.7 | 1715.9 | 1702.2 | 1685.9 | 1677.8 | 1667.9 | 1659.1 | 1653.2 | 1647.8 |
| 1633.5 | 1628.1 | 1625.2 | 1621.7 | 1609.0 | 1600.4 | 1593.5 | 1579.1 | 1566.5 | 1551.4 | 1533.5 | 1521.1 | 1512.2 | 1495.8 | 1489.7 |
| 1487.5 | 1478.4 | 1469.8 | 1459.9 | 1446.2 | 1444.9 | 1451.0 | 1517.7 | 1559.6 | 1604.7 | 1644.5 | 1595.0 | 0.0    | 0.0    | 0.0    |
| 0.0    | 0.0    |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 16     | 0.0    | 1790.8 | 1767.0 | 1746.3 | 1732.7 | 1720.1 | 1711.9 | 1693.3 | 1681.5 | 1671.0 | 1660.8 | 1651.7 | 1644.9 | 1637.6 |
| 1623.9 | 1617.5 | 1613.8 | 1608.5 | 1602.5 | 1596.4 | 1584.4 | 1574.5 | 1563.2 | 1547.7 | 1532.2 | 1520.0 | 1509.7 | 1498.7 | 1489.8 |
| 1488.0 | 1481.2 | 1474.5 | 1469.8 | 1449.5 | 1447.8 | 1455.1 | 1479.8 | 1562.9 | 1561.2 | 1595.3 | 0.0    | 0.0    | 0.0    | 0.0    |
| 0.0    | 0.0    |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 17     | 0.0    | 1793.4 | 1767.4 | 1745.3 | 1734.5 | 1718.1 | 1704.3 | 1690.5 | 1677.2 | 1670.0 | 1656.3 | 1648.3 | 1641.0 | 1628.5 |
| 1608.6 | 1606.6 | 1599.9 | 1592.1 | 1585.0 | 1577.2 | 1568.6 | 1560.0 | 1545.0 | 1535.5 | 1525.0 | 1514.1 | 1503.9 | 1497.4 | 1490.9 |
| 1486.4 | 1479.7 | 1472.7 | 1469.6 | 1456.5 | 1446.2 | 1445.7 | 1453.4 | 1460.7 | 1535.5 | 1549.1 | 0.0    | 0.0    | 0.0    | 0.0    |
| 0.0    | 0.0    |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 18     | 0.0    | 0.0    | 1776.7 | 1747.0 | 1733.3 | 1720.4 | 1703.1 | 1692.1 | 1683.3 | 1665.4 | 1656.6 | 1648.3 | 1640.1 | 1625.5 |
| 1597.8 | 1596.2 | 1588.8 | 1579.2 | 1567.2 | 1561.8 | 1554.0 | 1545.3 | 1538.2 | 1528.8 | 1519.0 | 1507.4 | 1496.1 | 1488.1 | 1483.0 |
| 1479.9 | 1476.2 | 1471.8 | 1467.0 | 1454.2 | 1445.3 | 1446.6 | 1446.5 | 1444.2 | 1486.3 | 1503.3 | 1486.6 | 0.0    | 0.0    | 0.0    |
| 0.0    | 0.0    |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 19     | 0.0    | 0.0    | 0.0    | 1757.4 | 1739.7 | 1724.8 | 1713.6 | 1700.1 | 1680.4 | 1670.3 | 1663.0 | 1654.1 | 1647.0 | 1631.8 |
| 1599.0 | 1596.0 | 1588.5 | 1577.5 | 1565.8 | 1560.6 | 1549.8 | 1541.9 | 1536.8 | 1528.9 | 1516.9 | 1497.6 | 1484.6 | 1476.6 | 1471.2 |
| 1468.5 | 1467.8 | 1466.0 | 1460.6 | 1453.1 | 1445.7 | 1441.5 | 1440.4 | 1448.8 | 1456.8 | 1483.6 | 1497.9 | 1446.5 | 0.0    | 0.0    |

[illegible]



```

MAXIMUM ITERATIONS ALLOWED FOR CLOSURE = 50
ACCELERATION PARAMETER = 1.0000
HEAD CHANGE CRITERION FOR CLOSURE = 0.10000E-02
SIP HEAD CHANGE PRINTOUT INTERVAL = 1

```

5 ITERATION PARAMETERS CALCULATED FROM SPECIFIED WSEED = 0.01000000 :



0.0000000E+00 0.6837722E+00 0.9000000E+00 0.9683772E+00 0.9900000E+00

STRESS PERIOD NO. 1, LENGTH = 1.000000

NUMBER OF TIME STEPS = 1

MULTIPLIER FOR DELT = 1.000

INITIAL TIME STEP SIZE = 1.000000

343 WELLS

| LAYER | ROW | COL | STRESS RATE | WELL NO. |
|-------|-----|-----|-------------|----------|
| 1     | 6   | 35  | -8195.0     | 1        |
| 1     | 6   | 36  | -8195.0     | 2        |
| 1     | 6   | 37  | -8195.0     | 3        |
| 1     | 7   | 35  | -8195.0     | 4        |
| 1     | 7   | 36  | -8195.0     | 5        |
| 1     | 7   | 37  | -8195.0     | 6        |
| 1     | 14  | 36  | -8195.0     | 7        |
| 1     | 14  | 37  | -8195.0     | 8        |
| 1     | 14  | 38  | -8195.0     | 9        |
| 1     | 15  | 36  | -8195.0     | 10       |
| 1     | 15  | 37  | -8195.0     | 11       |
| 1     | 15  | 38  | -8195.0     | 12       |
| 1     | 16  | 20  | -8195.0     | 13       |
| 1     | 16  | 21  | -8195.0     | 14       |
| 1     | 16  | 22  | -8195.0     | 15       |
| 1     | 16  | 28  | -8195.0     | 16       |
| 1     | 16  | 29  | -8195.0     | 17       |
| 1     | 16  | 30  | -8195.0     | 18       |
| 1     | 16  | 31  | -8195.0     | 19       |
| 1     | 16  | 35  | -8195.0     | 20       |
| 1     | 16  | 36  | -8195.0     | 21       |
| 1     | 16  | 37  | -8195.0     | 22       |
| 1     | 16  | 38  | -8195.0     | 23       |
| 1     | 17  | 20  | -8195.0     | 24       |
| 1     | 17  | 21  | -8195.0     | 25       |
| 1     | 17  | 22  | -8195.0     | 26       |
| 1     | 17  | 23  | -8195.0     | 27       |
| 1     | 17  | 28  | -8195.0     | 28       |
| 1     | 17  | 29  | -8195.0     | 29       |
| 1     | 17  | 30  | -8195.0     | 30       |
| 1     | 17  | 31  | -8195.0     | 31       |

|   |    |    |         |    |
|---|----|----|---------|----|
| 1 | 17 | 32 | -8195.0 | 32 |
| 1 | 17 | 35 | -8195.0 | 33 |
| 1 | 17 | 36 | -8195.0 | 34 |
| 1 | 17 | 37 | -8195.0 | 35 |
| 1 | 17 | 38 | -8195.0 | 36 |
| 1 | 18 | 21 | -8195.0 | 37 |
| 1 | 18 | 22 | -8195.0 | 38 |
| 1 | 18 | 23 | -8195.0 | 39 |
| 1 | 18 | 24 | -8195.0 | 40 |
| 1 | 18 | 29 | -8195.0 | 41 |
| 1 | 18 | 30 | -8195.0 | 42 |
| 1 | 18 | 31 | -8195.0 | 43 |
| 1 | 18 | 32 | -8195.0 | 44 |
| 1 | 18 | 33 | -8195.0 | 45 |
| 1 | 18 | 34 | -8195.0 | 46 |
| 1 | 18 | 35 | -8195.0 | 47 |
| 1 | 18 | 36 | -8195.0 | 48 |
| 1 | 18 | 37 | -8195.0 | 49 |
| 1 | 18 | 38 | -8195.0 | 50 |
| 1 | 19 | 15 | -8195.0 | 51 |
| 1 | 19 | 16 | -8195.0 | 52 |
| 1 | 19 | 17 | -8195.0 | 53 |
| 1 | 19 | 18 | -8195.0 | 54 |
| 1 | 19 | 19 | -8195.0 | 55 |
| 1 | 19 | 21 | -8195.0 | 56 |
| 1 | 19 | 22 | -8195.0 | 57 |
| 1 | 19 | 23 | -8195.0 | 58 |
| 1 | 19 | 24 | -8195.0 | 59 |
| 1 | 19 | 30 | -8195.0 | 60 |
| 1 | 19 | 31 | -8195.0 | 61 |
| 1 | 19 | 32 | -8195.0 | 62 |
| 1 | 19 | 33 | -8195.0 | 63 |
| 1 | 19 | 34 | -8195.0 | 64 |
| 1 | 19 | 35 | -8195.0 | 65 |
| 1 | 19 | 36 | -8195.0 | 66 |
| 1 | 19 | 37 | -8195.0 | 67 |
| 1 | 19 | 38 | -8195.0 | 68 |
| 1 | 19 | 39 | -8195.0 | 69 |
| 1 | 19 | 40 | -8195.0 | 70 |
| 1 | 19 | 41 | -8195.0 | 71 |
| 1 | 20 | 15 | -8195.0 | 72 |
| 1 | 20 | 16 | -8195.0 | 73 |
| 1 | 20 | 17 | -8195.0 | 74 |
| 1 | 20 | 18 | -8195.0 | 75 |

|   |    |    |         |     |
|---|----|----|---------|-----|
| 1 | 20 | 19 | -8195.0 | 76  |
| 1 | 20 | 20 | -8195.0 | 77  |
| 1 | 20 | 21 | -8195.0 | 78  |
| 1 | 20 | 22 | -8195.0 | 79  |
| 1 | 20 | 23 | -8195.0 | 80  |
| 1 | 20 | 24 | -8195.0 | 81  |
| 1 | 20 | 32 | -8195.0 | 82  |
| 1 | 20 | 33 | -8195.0 | 83  |
| 1 | 20 | 34 | -8195.0 | 84  |
| 1 | 20 | 35 | -8195.0 | 85  |
| 1 | 20 | 36 | -8195.0 | 86  |
| 1 | 20 | 37 | -8195.0 | 87  |
| 1 | 20 | 38 | -8195.0 | 88  |
| 1 | 20 | 39 | -8195.0 | 89  |
| 1 | 20 | 40 | -8195.0 | 90  |
| 1 | 20 | 41 | -8195.0 | 91  |
| 1 | 20 | 42 | -8195.0 | 92  |
| 1 | 21 | 15 | -8195.0 | 93  |
| 1 | 21 | 16 | -8195.0 | 94  |
| 1 | 21 | 17 | -8195.0 | 95  |
| 1 | 21 | 18 | -8195.0 | 96  |
| 1 | 21 | 19 | -8195.0 | 97  |
| 1 | 21 | 20 | -8195.0 | 98  |
| 1 | 21 | 21 | -8195.0 | 99  |
| 1 | 21 | 22 | -8195.0 | 100 |
| 1 | 21 | 23 | -8195.0 | 101 |
| 1 | 21 | 24 | -8195.0 | 102 |
| 1 | 21 | 27 | -8195.0 | 103 |
| 1 | 21 | 34 | -8195.0 | 104 |
| 1 | 21 | 35 | -8195.0 | 105 |
| 1 | 21 | 36 | -8195.0 | 106 |
| 1 | 21 | 37 | -8195.0 | 107 |
| 1 | 21 | 38 | -8195.0 | 108 |
| 1 | 21 | 39 | -8195.0 | 109 |
| 1 | 21 | 40 | -8195.0 | 110 |
| 1 | 21 | 41 | -8195.0 | 111 |
| 1 | 21 | 42 | -8195.0 | 112 |
| 1 | 21 | 43 | -8195.0 | 113 |
| 1 | 22 | 15 | -8195.0 | 114 |
| 1 | 22 | 16 | -8195.0 | 115 |
| 1 | 22 | 17 | -8195.0 | 116 |
| 1 | 22 | 18 | -8195.0 | 117 |
| 1 | 22 | 19 | -8195.0 | 118 |
| 1 | 22 | 20 | -8195.0 | 119 |
| 1 | 22 | 21 | -8195.0 | 120 |

|   |    |    |         |     |
|---|----|----|---------|-----|
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| 1 | 22 | 23 | -8195.0 | 122 |
| 1 | 22 | 24 | -8195.0 | 123 |
| 1 | 22 | 27 | -8195.0 | 124 |
| 1 | 22 | 35 | -8195.0 | 125 |
| 1 | 22 | 36 | -8195.0 | 126 |
| 1 | 22 | 37 | -8195.0 | 127 |
| 1 | 22 | 38 | -8195.0 | 128 |
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| 1 | 22 | 40 | -8195.0 | 130 |
| 1 | 22 | 41 | -8195.0 | 131 |
| 1 | 22 | 42 | -8195.0 | 132 |
| 1 | 22 | 43 | -8195.0 | 133 |
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| 1 | 23 | 17 | -8195.0 | 135 |
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| 1 | 23 | 19 | -8195.0 | 137 |
| 1 | 23 | 20 | -8195.0 | 138 |
| 1 | 23 | 21 | -8195.0 | 139 |
| 1 | 23 | 22 | -8195.0 | 140 |
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| 1 | 23 | 24 | -8195.0 | 142 |
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| 1 | 23 | 36 | -8195.0 | 145 |
| 1 | 23 | 37 | -8195.0 | 146 |
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| 1 | 23 | 42 | -8195.0 | 151 |
| 1 | 23 | 43 | -8195.0 | 152 |
| 1 | 24 | 17 | -8195.0 | 153 |
| 1 | 24 | 18 | -8195.0 | 154 |
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| 1 | 24 | 20 | -8195.0 | 156 |
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| 1 | 24 | 22 | -8195.0 | 158 |
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| 1 | 24 | 24 | -8195.0 | 160 |
| 1 | 24 | 26 | -8195.0 | 161 |
| 1 | 24 | 27 | -8195.0 | 162 |
| 1 | 24 | 36 | -8195.0 | 163 |
| 1 | 24 | 37 | -8195.0 | 164 |

|   |    |    |         |     |
|---|----|----|---------|-----|
| 1 | 24 | 38 | -8195.0 | 165 |
| 1 | 24 | 39 | -8195.0 | 166 |
| 1 | 24 | 40 | -8195.0 | 167 |
| 1 | 25 | 19 | -8195.0 | 168 |
| 1 | 25 | 22 | -8195.0 | 169 |
| 1 | 25 | 23 | -8195.0 | 170 |
| 1 | 25 | 24 | -8195.0 | 171 |
| 1 | 25 | 25 | -8195.0 | 172 |
| 1 | 25 | 26 | -8195.0 | 173 |
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| 1 | 25 | 28 | -8195.0 | 175 |
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| 1 | 25 | 36 | -8195.0 | 177 |
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| 1 | 26 | 20 | -8195.0 | 179 |
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| 1 | 26 | 22 | -8195.0 | 181 |
| 1 | 26 | 23 | -8195.0 | 182 |
| 1 | 26 | 24 | -8195.0 | 183 |
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| 1 | 26 | 26 | -8195.0 | 185 |
| 1 | 26 | 27 | -8195.0 | 186 |
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| 1 | 27 | 22 | -8195.0 | 189 |
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| 1 | 27 | 24 | -8195.0 | 191 |
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| 1 | 27 | 26 | -8195.0 | 193 |
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| 1 | 27 | 28 | -8195.0 | 195 |
| 1 | 27 | 29 | -8195.0 | 196 |
| 1 | 27 | 30 | -8195.0 | 197 |
| 1 | 27 | 34 | -8195.0 | 198 |
| 1 | 27 | 35 | -8195.0 | 199 |
| 1 | 27 | 36 | -8195.0 | 200 |
| 1 | 28 | 23 | -8195.0 | 201 |
| 1 | 28 | 24 | -8195.0 | 202 |
| 1 | 28 | 25 | -8195.0 | 203 |
| 1 | 28 | 26 | -8195.0 | 204 |
| 1 | 28 | 27 | -8195.0 | 205 |
| 1 | 28 | 28 | -8195.0 | 206 |
| 1 | 28 | 29 | -8195.0 | 207 |
| 1 | 28 | 30 | -8195.0 | 208 |
| 1 | 28 | 33 | -8195.0 | 209 |

|   |    |    |         |     |
|---|----|----|---------|-----|
| 1 | 28 | 34 | -8195.0 | 210 |
| 1 | 28 | 35 | -8195.0 | 211 |
| 1 | 28 | 36 | -8195.0 | 212 |
| 1 | 28 | 37 | -8195.0 | 213 |
| 1 | 28 | 38 | -8195.0 | 214 |
| 1 | 29 | 24 | -8195.0 | 215 |
| 1 | 29 | 25 | -8195.0 | 216 |
| 1 | 29 | 26 | -8195.0 | 217 |
| 1 | 29 | 27 | -8195.0 | 218 |
| 1 | 29 | 28 | -8195.0 | 219 |
| 1 | 29 | 29 | -8195.0 | 220 |
| 1 | 29 | 30 | -8195.0 | 221 |
| 1 | 29 | 31 | -8195.0 | 222 |
| 1 | 29 | 33 | -8195.0 | 223 |
| 1 | 29 | 34 | -8195.0 | 224 |
| 1 | 29 | 35 | -8195.0 | 225 |
| 1 | 29 | 36 | -8195.0 | 226 |
| 1 | 29 | 37 | -8195.0 | 227 |
| 1 | 29 | 38 | -8195.0 | 228 |
| 1 | 30 | 25 | -8195.0 | 229 |
| 1 | 30 | 26 | -8195.0 | 230 |
| 1 | 30 | 27 | -8195.0 | 231 |
| 1 | 30 | 28 | -8195.0 | 232 |
| 1 | 30 | 29 | -8195.0 | 233 |
| 1 | 30 | 30 | -8195.0 | 234 |
| 1 | 30 | 31 | -8195.0 | 235 |
| 1 | 30 | 34 | -8195.0 | 236 |
| 1 | 30 | 35 | -8195.0 | 237 |
| 1 | 30 | 36 | -8195.0 | 238 |
| 1 | 30 | 37 | -8195.0 | 239 |
| 1 | 31 | 26 | -8195.0 | 240 |
| 1 | 31 | 27 | -8195.0 | 241 |
| 1 | 31 | 28 | -8195.0 | 242 |
| 1 | 31 | 29 | -8195.0 | 243 |
| 1 | 31 | 30 | -8195.0 | 244 |
| 1 | 31 | 31 | -8195.0 | 245 |
| 1 | 31 | 35 | -8195.0 | 246 |
| 1 | 31 | 36 | -8195.0 | 247 |
| 1 | 31 | 37 | -8195.0 | 248 |
| 1 | 32 | 26 | -8195.0 | 249 |
| 1 | 32 | 27 | -8195.0 | 250 |
| 1 | 32 | 28 | -8195.0 | 251 |
| 1 | 32 | 29 | -8195.0 | 252 |
| 1 | 32 | 30 | -8195.0 | 253 |

|   |    |    |         |     |
|---|----|----|---------|-----|
| 1 | 32 | 31 | -8195.0 | 254 |
| 1 | 32 | 32 | -8195.0 | 255 |
| 1 | 32 | 33 | -8195.0 | 256 |
| 1 | 32 | 35 | -8195.0 | 257 |
| 1 | 32 | 36 | -8195.0 | 258 |
| 1 | 32 | 37 | -8195.0 | 259 |
| 1 | 32 | 38 | -8195.0 | 260 |
| 1 | 33 | 27 | -8195.0 | 261 |
| 1 | 33 | 28 | -8195.0 | 262 |
| 1 | 33 | 29 | -8195.0 | 263 |
| 1 | 33 | 30 | -8195.0 | 264 |
| 1 | 33 | 31 | -8195.0 | 265 |
| 1 | 33 | 32 | -8195.0 | 266 |
| 1 | 33 | 33 | -8195.0 | 267 |
| 1 | 33 | 34 | -8195.0 | 268 |
| 1 | 33 | 35 | -8195.0 | 269 |
| 1 | 33 | 37 | -8195.0 | 270 |
| 1 | 33 | 38 | -8195.0 | 271 |
| 1 | 34 | 27 | -8195.0 | 272 |
| 1 | 34 | 28 | -8195.0 | 273 |
| 1 | 34 | 29 | -8195.0 | 274 |
| 1 | 34 | 30 | -8195.0 | 275 |
| 1 | 34 | 31 | -8195.0 | 276 |
| 1 | 34 | 32 | -8195.0 | 277 |
| 1 | 34 | 33 | -8195.0 | 278 |
| 1 | 34 | 34 | -8195.0 | 279 |
| 1 | 34 | 35 | -8195.0 | 280 |
| 1 | 34 | 36 | -8195.0 | 281 |
| 1 | 35 | 28 | -8195.0 | 282 |
| 1 | 35 | 29 | -8195.0 | 283 |
| 1 | 35 | 30 | -8195.0 | 284 |
| 1 | 35 | 31 | -8195.0 | 285 |
| 1 | 35 | 32 | -8195.0 | 286 |
| 1 | 35 | 33 | -8195.0 | 287 |
| 1 | 35 | 34 | -8195.0 | 288 |
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| 1 | 35 | 36 | -8195.0 | 290 |
| 1 | 35 | 37 | -8195.0 | 291 |
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| 1 | 36 | 30 | -8195.0 | 294 |
| 1 | 36 | 31 | -8195.0 | 295 |
| 1 | 36 | 32 | -8195.0 | 296 |
| 1 | 36 | 33 | -8195.0 | 297 |
| 1 | 36 | 34 | -8195.0 | 298 |

|   |    |    |         |     |
|---|----|----|---------|-----|
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| 1 | 36 | 36 | -8195.0 | 300 |
| 1 | 36 | 37 | -8195.0 | 301 |
| 1 | 37 | 29 | -8195.0 | 302 |
| 1 | 37 | 30 | -8195.0 | 303 |
| 1 | 37 | 31 | -8195.0 | 304 |
| 1 | 37 | 32 | -8195.0 | 305 |
| 1 | 37 | 33 | -8195.0 | 306 |
| 1 | 37 | 34 | -8195.0 | 307 |
| 1 | 37 | 35 | -8195.0 | 308 |
| 1 | 37 | 36 | -8195.0 | 309 |
| 1 | 37 | 37 | -8195.0 | 310 |
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| 1 | 38 | 32 | -8195.0 | 314 |
| 1 | 38 | 33 | -8195.0 | 315 |
| 1 | 38 | 34 | -8195.0 | 316 |
| 1 | 38 | 35 | -8195.0 | 317 |
| 1 | 38 | 36 | -8195.0 | 318 |
| 1 | 38 | 37 | -8195.0 | 319 |
| 1 | 38 | 38 | -8195.0 | 320 |
| 1 | 38 | 39 | -8195.0 | 321 |
| 1 | 39 | 31 | -8195.0 | 322 |
| 1 | 39 | 32 | -8195.0 | 323 |
| 1 | 39 | 33 | -8195.0 | 324 |
| 1 | 39 | 34 | -8195.0 | 325 |
| 1 | 39 | 35 | -8195.0 | 326 |
| 1 | 39 | 36 | -8195.0 | 327 |
| 1 | 39 | 37 | -8195.0 | 328 |
| 1 | 39 | 38 | -8195.0 | 329 |
| 1 | 39 | 39 | -8195.0 | 330 |
| 1 | 40 | 33 | -8195.0 | 331 |
| 1 | 40 | 34 | -8195.0 | 332 |
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| 1 | 40 | 36 | -8195.0 | 334 |
| 1 | 40 | 37 | -8195.0 | 335 |
| 1 | 40 | 38 | -8195.0 | 336 |
| 1 | 40 | 39 | -8195.0 | 337 |
| 1 | 41 | 33 | -8195.0 | 338 |
| 1 | 41 | 34 | -8195.0 | 339 |
| 1 | 41 | 35 | -8195.0 | 340 |
| 1 | 41 | 36 | -8195.0 | 341 |
| 1 | 41 | 37 | -8195.0 | 342 |



## 123 DRAINS

1 41 38 -8195.0 343

| LAYER | ROW | COL | ELEVATION | CONDUCTANCE | DRAIN NO. |
|-------|-----|-----|-----------|-------------|-----------|
| 1     | 14  | 2   | 1850.     | 0.5000E+05  | 1         |
| 1     | 15  | 2   | 1835.     | 0.5000E+05  | 2         |
| 1     | 16  | 2   | 1815.     | 0.5000E+05  | 3         |
| 1     | 17  | 2   | 1800.     | 0.5000E+05  | 4         |
| 1     | 18  | 3   | 1775.     | 0.5000E+05  | 5         |
| 1     | 19  | 4   | 1750.     | 0.5000E+05  | 6         |
| 1     | 20  | 5   | 1740.     | 0.5000E+05  | 7         |
| 1     | 21  | 5   | 1725.     | 0.5000E+05  | 8         |
| 1     | 21  | 6   | 1715.     | 0.5000E+05  | 9         |
| 1     | 22  | 7   | 1700.     | 0.5000E+05  | 10        |
| 1     | 23  | 7   | 1690.     | 0.5000E+05  | 11        |
| 1     | 24  | 8   | 1675.     | 0.5000E+05  | 12        |
| 1     | 25  | 9   | 1665.     | 0.5000E+05  | 13        |
| 1     | 26  | 9   | 1650.     | 0.5000E+05  | 14        |
| 1     | 26  | 10  | 1640.     | 0.5000E+05  | 15        |
| 1     | 26  | 11  | 1625.     | 0.5000E+05  | 16        |
| 1     | 26  | 12  | 1615.     | 0.5000E+05  | 17        |
| 1     | 26  | 13  | 1600.     | 0.5000E+05  | 18        |
| 1     | 26  | 14  | 1590.     | 0.5000E+05  | 19        |
| 1     | 27  | 15  | 1578.     | 0.5000E+05  | 20        |
| 1     | 27  | 16  | 1565.     | 0.5000E+05  | 21        |
| 1     | 28  | 17  | 1555.     | 0.5000E+05  | 22        |
| 1     | 28  | 18  | 1545.     | 0.5000E+05  | 23        |
| 1     | 28  | 19  | 1540.     | 0.5000E+05  | 24        |
| 1     | 2   | 22  | 1730.     | 0.5000E+05  | 25        |
| 1     | 2   | 23  | 1715.     | 0.5000E+05  | 26        |
| 1     | 2   | 24  | 1695.     | 0.5000E+05  | 27        |
| 1     | 2   | 25  | 1671.     | 0.5000E+05  | 28        |
| 1     | 3   | 31  | 1725.     | 0.5000E+05  | 29        |
| 1     | 4   | 30  | 1745.     | 0.5000E+05  | 30        |
| 1     | 4   | 31  | 1720.     | 0.5000E+05  | 31        |
| 1     | 5   | 29  | 1775.     | 0.5000E+05  | 32        |
| 1     | 7   | 31  | 1625.     | 0.5000E+05  | 33        |
| 1     | 8   | 17  | 1755.     | 0.5000E+05  | 34        |
| 1     | 8   | 18  | 1745.     | 0.5000E+05  | 35        |
| 1     | 8   | 19  | 1735.     | 0.5000E+05  | 36        |
| 1     | 8   | 31  | 1625.     | 0.5000E+05  | 37        |

|   |    |    |       |            |    |
|---|----|----|-------|------------|----|
| 1 | 8  | 32 | 1615. | 0.5000E+05 | 38 |
| 1 | 8  | 33 | 1600. | 0.5000E+05 | 39 |
| 1 | 9  | 20 | 1725. | 0.5000E+05 | 40 |
| 1 | 9  | 21 | 1715. | 0.5000E+05 | 41 |
| 1 | 9  | 22 | 1705. | 0.5000E+05 | 42 |
| 1 | 9  | 28 | 1635. | 0.5000E+05 | 43 |
| 1 | 9  | 29 | 1630. | 0.5000E+05 | 44 |
| 1 | 9  | 31 | 1610. | 0.5000E+05 | 45 |
| 1 | 9  | 34 | 1580. | 0.5000E+05 | 46 |
| 1 | 9  | 37 | 1600. | 0.5000E+05 | 47 |
| 1 | 10 | 23 | 1690. | 0.5000E+05 | 48 |
| 1 | 10 | 26 | 1660. | 0.5000E+05 | 49 |
| 1 | 10 | 27 | 1650. | 0.5000E+05 | 50 |
| 1 | 10 | 28 | 1640. | 0.5000E+05 | 51 |
| 1 | 10 | 30 | 1620. | 0.5000E+05 | 52 |
| 1 | 10 | 31 | 1615. | 0.5000E+05 | 53 |
| 1 | 10 | 35 | 1570. | 0.5000E+05 | 54 |
| 1 | 10 | 37 | 1540. | 0.5000E+05 | 55 |
| 1 | 10 | 38 | 1535. | 0.5000E+05 | 56 |
| 1 | 11 | 23 | 1685. | 0.5000E+05 | 57 |
| 1 | 11 | 24 | 1675. | 0.5000E+05 | 58 |
| 1 | 11 | 25 | 1670. | 0.5000E+05 | 59 |
| 1 | 11 | 36 | 1555. | 0.5000E+05 | 60 |
| 1 | 11 | 37 | 1545. | 0.5000E+05 | 61 |
| 1 | 18 | 32 | 1480. | 0.8000E+05 | 62 |
| 1 | 18 | 38 | 1440. | 0.8000E+05 | 63 |
| 1 | 19 | 32 | 1475. | 0.8000E+05 | 64 |
| 1 | 19 | 33 | 1465. | 0.8000E+05 | 65 |
| 1 | 19 | 37 | 1425. | 0.8000E+05 | 66 |
| 1 | 20 | 34 | 1445. | 0.8000E+05 | 67 |
| 1 | 20 | 37 | 1415. | 0.8000E+05 | 68 |
| 1 | 21 | 35 | 1435. | 0.8000E+05 | 69 |
| 1 | 21 | 36 | 1415. | 0.8000E+05 | 70 |
| 1 | 21 | 37 | 1407. | 0.8000E+05 | 71 |
| 1 | 21 | 38 | 1400. | 0.8000E+05 | 72 |
| 1 | 22 | 39 | 1395. | 0.8000E+05 | 73 |
| 1 | 23 | 37 | 1410. | 0.8000E+05 | 74 |
| 1 | 23 | 38 | 1400. | 0.8000E+05 | 75 |
| 1 | 23 | 39 | 1390. | 0.8000E+05 | 76 |
| 1 | 23 | 40 | 1385. | 0.8000E+05 | 77 |
| 1 | 23 | 41 | 1380. | 0.8000E+05 | 78 |
| 1 | 23 | 42 | 1370. | 0.8000E+05 | 79 |
| 1 | 23 | 43 | 1365. | 0.8000E+05 | 80 |
| 1 | 24 | 35 | 1445. | 0.8000E+05 | 81 |

|   |    |    |       |            |     |
|---|----|----|-------|------------|-----|
| 1 | 24 | 36 | 1435. | 0.8000E+05 | 82  |
| 1 | 24 | 37 | 1420. | 0.8000E+05 | 83  |
| 1 | 24 | 43 | 1360. | 0.8000E+05 | 84  |
| 1 | 24 | 44 | 1355. | 0.8000E+05 | 85  |
| 1 | 24 | 45 | 1355. | 0.8000E+05 | 86  |
| 1 | 21 | 24 | 1575. | 0.1000E+05 | 87  |
| 1 | 22 | 24 | 1567. | 0.1000E+05 | 88  |
| 1 | 23 | 24 | 1559. | 0.1000E+05 | 89  |
| 1 | 24 | 25 | 1550. | 0.1000E+05 | 90  |
| 1 | 25 | 25 | 1544. | 0.1000E+05 | 91  |
| 1 | 25 | 26 | 1538. | 0.1000E+05 | 92  |
| 1 | 26 | 26 | 1532. | 0.1000E+05 | 93  |
| 1 | 27 | 26 | 1525. | 0.1000E+05 | 94  |
| 1 | 28 | 26 | 1513. | 0.1000E+05 | 95  |
| 1 | 29 | 27 | 1500. | 0.1000E+05 | 96  |
| 1 | 29 | 28 | 1487. | 0.1000E+05 | 97  |
| 1 | 30 | 29 | 1475. | 0.1000E+05 | 98  |
| 1 | 31 | 29 | 1465. | 0.1000E+05 | 99  |
| 1 | 32 | 29 | 1455. | 0.1000E+05 | 100 |
| 1 | 33 | 30 | 1445. | 0.1000E+05 | 101 |
| 1 | 33 | 31 | 1438. | 0.1000E+05 | 102 |
| 1 | 33 | 32 | 1430. | 0.1000E+05 | 103 |
| 1 | 33 | 33 | 1420. | 0.1000E+05 | 104 |
| 1 | 33 | 34 | 1415. | 0.1000E+05 | 105 |
| 1 | 34 | 34 | 1410. | 0.1000E+05 | 106 |
| 1 | 35 | 34 | 1405. | 0.1000E+05 | 107 |
| 1 | 36 | 35 | 1395. | 0.1000E+05 | 108 |
| 1 | 37 | 36 | 1385. | 0.1000E+05 | 109 |
| 1 | 38 | 36 | 1375. | 0.1000E+05 | 110 |
| 1 | 39 | 37 | 1370. | 0.1000E+05 | 111 |
| 1 | 40 | 38 | 1365. | 0.1000E+05 | 112 |
| 1 | 28 | 34 | 1450. | 0.8000E+05 | 113 |
| 1 | 28 | 35 | 1438. | 0.8000E+05 | 114 |
| 1 | 28 | 36 | 1416. | 0.8000E+05 | 115 |
| 1 | 29 | 36 | 1400. | 0.8000E+05 | 116 |
| 1 | 29 | 37 | 1390. | 0.8000E+05 | 117 |
| 1 | 30 | 38 | 1380. | 0.8000E+05 | 118 |
| 1 | 30 | 39 | 1365. | 0.8000E+05 | 119 |
| 1 | 31 | 40 | 1350. | 0.8000E+05 | 120 |
| 1 | 31 | 41 | 1340. | 0.8000E+05 | 121 |
| 1 | 32 | 42 | 1340. | 0.8000E+05 | 122 |
| 1 | 40 | 46 | 1370. | 0.8000E+05 | 123 |

[illegible]

[illegible]

[illegible]

Attachment A 51





Attachment A 53

## 27 RIVER REACHES

| LAYER | ROW | COL | STAGE | CONDUCTANCE | BOTTOM ELEVATION | RIVER REACH |
|-------|-----|-----|-------|-------------|------------------|-------------|
| 1     | 28  | 20  | 1532. | 0.3000E+05  | 1530.            | 1           |
| 1     | 29  | 21  | 1522. | 0.3000E+05  | 1520.            | 2           |
| 1     | 29  | 22  | 1512. | 0.3000E+05  | 1510.            | 3           |
| 1     | 30  | 23  | 1502. | 0.3000E+05  | 1500.            | 4           |
| 1     | 31  | 24  | 1492. | 0.3000E+05  | 1490.            | 5           |
| 1     | 32  | 24  | 1482. | 0.3000E+05  | 1480.            | 6           |
| 1     | 33  | 25  | 1477. | 0.3000E+05  | 1475.            | 7           |
| 1     | 34  | 25  | 1472. | 0.3000E+05  | 1470.            | 8           |
| 1     | 35  | 26  | 1462. | 0.3000E+05  | 1460.            | 9           |
| 1     | 36  | 27  | 1452. | 0.3000E+05  | 1450.            | 10          |
| 1     | 37  | 28  | 1444. | 0.3000E+05  | 1442.            | 11          |
| 1     | 38  | 29  | 1437. | 0.3000E+05  | 1435.            | 12          |
| 1     | 39  | 29  | 1430. | 0.3000E+05  | 1428.            | 13          |
| 1     | 39  | 30  | 1422. | 0.3000E+05  | 1420.            | 14          |
| 1     | 39  | 39  | 1362. | 0.3000E+05  | 1360.            | 15          |
| 1     | 39  | 40  | 1352. | 0.3000E+05  | 1350.            | 16          |
| 1     | 40  | 31  | 1417. | 0.3000E+05  | 1415.            | 17          |
| 1     | 40  | 32  | 1412. | 0.3000E+05  | 1410.            | 18          |
| 1     | 40  | 39  | 1355. | 0.3000E+05  | 1353.            | 19          |
| 1     | 41  | 32  | 1407. | 0.3000E+05  | 1405.            | 20          |
| 1     | 41  | 39  | 1357. | 0.3000E+05  | 1355.            | 21          |
| 1     | 42  | 33  | 1402. | 0.3000E+05  | 1400.            | 22          |
| 1     | 42  | 34  | 1394. | 0.3000E+05  | 1392.            | 23          |
| 1     | 42  | 35  | 1387. | 0.3000E+05  | 1385.            | 24          |
| 1     | 42  | 36  | 1380. | 0.3000E+05  | 1378.            | 25          |
| 1     | 42  | 37  | 1372. | 0.3000E+05  | 1370.            | 26          |
| 1     | 42  | 38  | 1364. | 0.3000E+05  | 1362.            | 27          |

31 ITERATIONS FOR TIME STEP 1 IN STRESS PERIOD 1

## MAXIMUM HEAD CHANGE FOR EACH ITERATION:

HEAD CHANGE LAYER, ROW, COL HEAD CHANGE LAYER, ROW, COL HEAD CHANGE LAYER, ROW, COL HEAD CHANGE LAYER, ROW, COL HEAD CHANGE LAYER, ROW, COL  
 ER, ROW, COL

112.5 ( 1, 42, 33) -110.2 ( 1, 42, 33) -22.99 ( 1, 10, 26) -11.13 ( 1, 2, 22) -8.975 ( 1, 10, 23)  
 14.16 ( 1, 2, 25) -13.75 ( 1, 2, 25) -2.131 ( 1, 3, 23) -2.057 ( 1, 2, 22) 1.223 ( 1, 15, 23)  
 0.8901 ( 1, 6, 41) 0.1770 ( 1, 6, 41) 0.1901 ( 1, 8, 19) 0.2039 ( 1, 11, 11) 0.1931 ( 1, 8, 19)

0.3916E-01 ( 1, 6, 41) 0.2554E-01 ( 1, 8, 17) 0.3133E-01 ( 1, 9, 17) 0.4265E-01 ( 1, 8, 19) 0.2777E-01 ( 1, 12, 7)  
 0.1083E-01 ( 1, 8, 19) 0.5277E-02 ( 1, 9, 18) 0.8600E-02 ( 1, 8, 19) 0.7081E-02 ( 1, 10, 15) 0.1000E-01 ( 1, 8, 19)  
 0.1282E-02 ( 1, 10, 23) 0.1151E-02 ( 1, 8, 17) 0.1349E-02 ( 1, 9, 17) 0.2182E-02 ( 1, 8, 19) 0.1311E-02 ( 1, 10, 13)  
 0.5723E-03 ( 1, 8, 19)

HEAD/DRAWDOWN PRINTOUT FLAG = 1 TOTAL BUDGET PRINTOUT FLAG = 1 CELL-BY-CELL FLOW TERM FLAG = 1

OUTPUT FLAGS FOR ALL LAYERS ARE THE SAME:

HEAD DRAWDOWN HEAD DRAWDOWN  
 PRINTOUT PRINTOUT SAVE SAVE

1 1 1 1  
 " CONSTANT HEAD" BUDGET VALUES WILL BE SAVED ON UNIT 30 AT END OF TIME STEP 1, STRESS PERIOD 1  
 "FLOW RIGHT FACE " BUDGET VALUES WILL BE SAVED ON UNIT 30 AT END OF TIME STEP 1, STRESS PERIOD 1  
 "FLOW FRONT FACE " BUDGET VALUES WILL BE SAVED ON UNIT 30 AT END OF TIME STEP 1, STRESS PERIOD 1  
 " WELLS" BUDGET VALUES WILL BE SAVED ON UNIT 30 AT END OF TIME STEP 1, STRESS PERIOD 1  
 " DRAINS" BUDGET VALUES WILL BE SAVED ON UNIT 30 AT END OF TIME STEP 1, STRESS PERIOD 1  
 " RECHARGE" BUDGET VALUES WILL BE SAVED ON UNIT 30 AT END OF TIME STEP 1, STRESS PERIOD 1  
 " RIVER LEAKAGE" BUDGET VALUES WILL BE SAVED ON UNIT 30 AT END OF TIME STEP 1, STRESS PERIOD 1

HEAD IN LAYER 1 AT END OF TIME STEP 1 IN STRESS PERIOD 1

|    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 | 13 | 14 | 15 |
| 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 |
| 46 | 47 |    |    |    |    |    |    |    |    |    |    |    |    |    |

|   |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
|   | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
|   | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
|   | 0.0 | 0.0 |     |     |     |     |     |     |     |     |     |     |     |     |

|   |     |     |     |     |     |        |        |        |        |     |     |     |     |     |
|---|-----|-----|-----|-----|-----|--------|--------|--------|--------|-----|-----|-----|-----|-----|
| 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0    | 0.0    | 0.0    | 0.0    | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
|   | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1684.2 | 1683.2 | 1680.2 | 1671.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
|   | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0    | 0.0    | 0.0    | 0.0    | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
|   | 0.0 | 0.0 |     |     |     |        |        |        |        |     |     |     |     |     |

|   |        |     |     |     |     |        |        |        |        |        |        |        |        |        |
|---|--------|-----|-----|-----|-----|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 3 | 0.0    | 0.0 | 0.0 | 0.0 | 0.0 | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
|   | 0.0    | 0.0 | 0.0 | 0.0 | 0.0 | 1684.5 | 1683.9 | 1683.2 | 1682.8 | 1687.7 | 1694.4 | 1705.2 | 1716.6 | 1720.8 |
|   | 1720.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
|   | 0.0    | 0.0 |     |     |     |        |        |        |        |        |        |        |        |        |

|   |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|



|    |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
|----|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 13 | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 1713.4 | 1709.5 | 1703.8 | 1698.9 | 1694.0 | 1689.4 | 1684.7 | 1680.2 | 1675.6 | 1671.1 | 1666.8 |
|    | 1662.6 | 1658.5 | 1654.2 | 1649.8 | 1645.2 | 1640.3 | 1635.2 | 1629.7 | 1623.5 | 1616.6 | 1609.1 | 1601.0 | 1592.7 | 1584.8 | 1576.9 |        |
|    | 1569.2 | 1562.5 | 1558.5 | 1556.7 | 1552.9 | 1547.6 | 1540.9 | 1532.1 | 1524.6 | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
|    | 0.0    | 0.0    |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 14 | 0.0    | 1728.4 | 1726.3 | 1722.1 | 1716.1 | 1710.7 | 1704.9 | 1699.3 | 1693.8 | 1688.6 | 1683.4 | 1678.4 | 1673.3 | 1668.3 | 1663.8 |        |
|    | 1659.5 | 1655.1 | 1650.6 | 1645.9 | 1641.1 | 1636.2 | 1631.3 | 1626.2 | 1620.5 | 1613.3 | 1604.2 | 1593.7 | 1582.4 | 1573.2 | 1564.9 |        |
|    | 1557.6 | 1552.2 | 1550.9 | 1548.2 | 1543.6 | 1536.9 | 1530.6 | 1518.4 | 1515.5 | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
|    | 0.0    | 0.0    |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 15 | 0.0    | 1729.3 | 1727.6 | 1723.2 | 1717.4 | 1711.4 | 1705.2 | 1698.9 | 1692.9 | 1687.0 | 1681.3 | 1675.9 | 1670.3 | 1664.2 | 1660.0 |        |
|    | 1655.7 | 1651.2 | 1646.4 | 1641.4 | 1636.2 | 1631.3 | 1626.8 | 1622.6 | 1618.1 | 1610.9 | 1600.2 | 1586.2 | 1574.4 | 1565.0 | 1556.4 |        |
|    | 1548.9 | 1543.3 | 1540.7 | 1536.7 | 1531.0 | 1523.6 | 1516.4 | 1508.0 | 1505.4 | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
|    | 0.0    | 0.0    |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 16 | 0.0    | 1730.1 | 1729.2 | 1724.9 | 1718.3 | 1711.7 | 1704.9 | 1697.9 | 1691.0 | 1684.5 | 1678.0 | 1673.1 | 1666.8 | 1660.9 | 1657.6 |        |
|    | 1653.5 | 1648.8 | 1643.8 | 1638.6 | 1633.2 | 1628.2 | 1623.8 | 1620.3 | 1617.8 | 1611.3 | 1598.7 | 1582.7 | 1565.4 | 1555.4 | 1547.2 |        |
|    | 1538.6 | 1531.5 | 1527.0 | 1521.9 | 1515.0 | 1507.5 | 1500.0 | 1493.6 | 1485.9 | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
|    | 0.0    | 0.0    |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 17 | 0.0    | 1729.5 | 1727.4 | 1724.6 | 1718.6 | 1711.9 | 1704.3 | 1696.1 | 1688.1 | 1681.2 | 1675.2 | 1671.8 | 1667.2 | 1662.0 | 1657.4 |        |
|    | 1652.6 | 1647.7 | 1642.7 | 1637.4 | 1631.9 | 1626.7 | 1622.1 | 1618.1 | 1614.7 | 1611.3 | 1599.5 | 1579.8 | 1558.7 | 1547.4 | 1536.2 |        |
|    | 1524.1 | 1512.1 | 1508.4 | 1504.0 | 1497.0 | 1488.5 | 1478.9 | 1470.4 | 1464.8 | 1458.7 | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
|    | 0.0    | 0.0    |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 18 | 0.0    | 0.0    | 1725.0 | 1721.1 | 1715.9 | 1712.2 | 1703.9 | 1693.4 | 1685.5 | 1681.6 | 1676.5 | 1671.7 | 1666.7 | 1661.4 | 1656.2 |        |
|    | 1651.0 | 1645.9 | 1640.7 | 1635.3 | 1629.8 | 1624.2 | 1619.1 | 1614.4 | 1610.7 | 1608.1 | 1596.8 | 1577.4 | 1557.9 | 1538.3 | 1523.7 |        |
|    | 1506.9 | 1482.2 | 1485.5 | 1483.5 | 1477.5 | 1467.6 | 1454.5 | 1441.5 | 1447.3 | 1443.5 | 1437.4 | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
|    | 0.0    | 0.0    |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 19 | 0.0    | 0.0    | 0.0    | 1717.8 | 1713.0 | 1708.1 | 1700.7 | 1693.9 | 1687.2 | 1681.7 | 1676.2 | 1670.8 | 1665.3 | 1659.7 | 1653.9 |        |
|    | 1648.4 | 1643.1 | 1637.7 | 1632.2 | 1626.6 | 1620.6 | 1614.8 | 1609.5 | 1605.0 | 1602.3 | 1591.4 | 1573.6 | 1555.9 | 1536.6 | 1514.4 |        |
|    | 1495.8 | 1475.8 | 1466.1 | 1464.7 | 1459.0 | 1447.3 | 1426.6 | 1430.3 | 1432.6 | 1430.8 | 1426.9 | 1426.5 | 1422.2 | 0.0    | 0.0    | 0.0    |
|    | 0.0    | 0.0    |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 20 | 0.0    | 0.0    | 0.0    | 0.0    | 1709.0 | 1705.2 | 1699.0 | 1692.8 | 1686.5 | 1680.6 | 1674.8 | 1669.0 | 1663.1 | 1657.1 | 1651.0 |        |
|    | 1645.3 | 1639.7 | 1634.2 | 1628.5 | 1622.5 | 1616.1 | 1609.5 | 1603.0 | 1597.1 | 1593.7 | 1582.2 | 1568.9 | 1554.6 | 1536.7 | 1516.3 |        |
|    | 1494.0 | 1474.9 | 1463.1 | 1446.4 | 1443.9 | 1431.8 | 1415.8 | 1417.7 | 1420.3 | 1420.5 | 1419.0 | 1417.5 | 1416.1 | 1412.8 | 0.0    | 0.0    |
|    | 0.0    | 0.0    |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 21 | 0.0    | 0.0    | 0.0    | 0.0    | 1707.1 | 1703.2 | 1696.3 | 1690.4 | 1684.4 | 1678.3 | 1672.2 | 1666.1 | 1659.9 | 1653.5 | 1647.1 |        |
|    | 1641.2 | 1635.6 | 1630.1 | 1624.4 | 1618.2 | 1611.1 | 1603.4 | 1595.2 | 1586.1 | 1581.7 | 1572.4 | 1566.4 | 1555.9 | 1538.9 | 1519.3 |        |
|    | 1498.3 | 1476.8 | 1461.7 | 1449.1 | 1435.4 | 1416.4 | 1407.7 | 1401.2 | 1407.5 | 1409.4 | 1408.7 | 1407.4 | 1407.0 | 1407.9 | 0.0    | 0.0    |
|    | 0.0    | 0.0    |        |        |        |        |        |        |        |        |        |        |        |        |        |        |





## Attachment A

[illegible]





|    |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
|----|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 13 | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   | 41.65  | 40.48  | 31.21  | 16.08  | 5.97   | -4.36  | 0.27   | -0.17  | -0.59  | -1.10  | -1.81  |
|    | -2.62  | -3.46  | 0.80   | 0.21   | 4.84   | 24.68  | 39.75  | 45.27  | 51.47  | 58.35  | 55.90  | 53.96  | 52.29  | 50.22  | 43.10  | 0.00   |
|    | 45.85  | 27.47  | 11.48  | 3.32   | 2.09   | 7.43   | 14.07  | 22.92  | 45.45  | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   |
|    | 0.00   | 0.00   |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 14 | 0.00   | 41.61  | 33.69  | 27.92  | 18.92  | 14.34  | 5.07   | 0.70   | -5.83  | -3.59  | -3.43  | -3.38  | -3.31  | -3.30  | -3.77  | -3.77  |
|    | -4.45  | -5.11  | -3.62  | -0.93  | 3.94   | 8.83   | 18.72  | 33.78  | 49.50  | 61.71  | 60.75  | 56.34  | 57.57  | 51.77  | 45.07  | 0.00   |
|    | 37.42  | 17.77  | 4.05   | -8.18  | -8.58  | -1.92  | 4.39   | 16.62  | 24.48  | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   |
|    | 0.00   | 0.00   |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 15 | 0.00   | 40.71  | 32.43  | 26.85  | 12.61  | 3.57   | -5.20  | -3.93  | -7.85  | -4.97  | -6.27  | -5.91  | -5.26  | -7.25  | -4.98  | -4.98  |
|    | -5.71  | -4.18  | -1.38  | 3.64   | 3.77   | 3.69   | 8.23   | 17.43  | 31.90  | 64.05  | 59.79  | 53.83  | 45.64  | 40.05  | 33.56  | 0.00   |
|    | 16.11  | -3.31  | -5.73  | -11.67 | -20.98 | -18.56 | -11.44 | -8.03  | -30.39 | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   |
|    | 0.00   | 0.00   |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 16 | 0.00   | 29.91  | 20.84  | 15.10  | 1.74   | -1.72  | -9.95  | -12.92 | -8.01  | -4.46  | -8.05  | -5.07  | -3.84  | -2.88  | -7.64  | -7.64  |
|    | -6.46  | -3.78  | -3.80  | -3.59  | -3.16  | 1.81   | 6.17   | 4.66   | 7.23   | 8.66   | 21.33  | 32.28  | 39.57  | 29.57  | 12.76  | 0.00   |
|    | -3.62  | -11.52 | -16.97 | -21.92 | -30.01 | -32.45 | -39.99 | -23.59 | -15.85 | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   |
|    | 0.00   | 0.00   |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 17 | 0.00   | 20.47  | 12.60  | 5.42   | -1.61  | -6.90  | -9.33  | -11.11 | -8.08  | -6.22  | -5.19  | -6.78  | -7.18  | -7.01  | -10.37 | -10.37 |
|    | -7.61  | -7.74  | -12.69 | -12.42 | -6.93  | -6.72  | -7.08  | -3.06  | -4.73  | -1.31  | 10.53  | 20.24  | 26.32  | 12.55  | -1.22  | 0.00   |
|    | -9.06  | -12.07 | -13.45 | -24.00 | -21.96 | -23.47 | -18.91 | -15.38 | -9.79  | 1.27   | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   |
|    | 0.00   | 0.00   |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 18 | 0.00   | 0.00   | 15.04  | 3.85   | -5.93  | -12.16 | -13.92 | -8.38  | -5.55  | -6.59  | -8.46  | -6.71  | -3.67  | -11.41 | -16.21 | -16.21 |
|    | -21.02 | -25.88 | -25.69 | -20.34 | -14.78 | -14.20 | -9.06  | -4.44  | -5.69  | -3.07  | 3.21   | 7.64   | 12.14  | 16.71  | -3.73  | 0.00   |
|    | -11.89 | -2.20  | -10.49 | -13.55 | -17.51 | -12.58 | -9.53  | -1.47  | -17.25 | -3.53  | -7.45  | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   |
|    | 0.00   | 0.00   |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 19 | 0.00   | 0.00   | 0.00   | 2.19   | -8.04  | -13.10 | -15.74 | -13.90 | -12.22 | -11.70 | -11.22 | -10.84 | -15.34 | -19.71 | -23.94 | -23.94 |
|    | -28.44 | -28.09 | -27.71 | -22.21 | -21.60 | -15.62 | -9.81  | -4.45  | -5.04  | -7.27  | -1.38  | 1.36   | 9.12   | 8.42   | 5.59   | 0.00   |
|    | -0.81  | -0.77  | -1.11  | -9.69  | -9.00  | -2.30  | -1.65  | 4.67   | 2.42   | -0.78  | 3.10   | 3.52   | 7.79   | 0.00   | 0.00   | 0.00   |
|    | 0.00   | 0.00   |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 20 | 0.00   | 0.00   | 0.00   | 0.00   | -9.03  | -15.20 | -14.04 | -12.76 | -16.50 | -15.59 | -14.78 | -16.99 | -18.10 | -22.09 | -21.01 | -21.01 |
|    | -25.26 | -19.73 | -19.21 | -18.51 | -17.53 | -11.12 | -9.46  | -7.97  | -7.12  | -8.71  | -2.22  | 6.06   | 10.43  | 13.25  | 8.65   | 0.00   |
|    | 16.01  | 15.08  | 1.92   | -1.44  | -8.88  | -6.81  | -0.83  | -2.72  | 4.70   | -5.48  | -8.96  | -7.50  | -16.06 | -12.83 | 0.00   | 0.00   |
|    | 0.00   | 0.00   |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 21 | 0.00   | 0.00   | 0.00   | 0.00   | -17.06 | -18.25 | -21.28 | -20.43 | -19.38 | -18.26 | -17.20 | -16.11 | -14.85 | -18.48 | -17.06 | -17.06 |
|    | -21.16 | -20.60 | -20.05 | -19.43 | -18.23 | -16.15 | -18.36 | -15.15 | -11.06 | -11.73 | -7.43  | -6.40  | -0.92  | 6.10   | 10.68  | 10.68  |
|    | 11.70  | 23.21  | 18.28  | 15.91  | -0.37  | -1.38  | -0.65  | -1.20  | -2.53  | -9.42  | -13.71 | -17.44 | -16.96 | -22.94 | 0.00   | 0.00   |



[illegible]

|      |       |       |       |       |       |        |       |       |       |      |      |      |        |        |
|------|-------|-------|-------|-------|-------|--------|-------|-------|-------|------|------|------|--------|--------|
| 1.43 | 10.29 | 15.67 | 22.32 | 20.22 | -5.36 | -10.09 | 18.35 | -4.58 | -3.91 | 0.00 | 0.00 | 0.00 | -39.21 | -31.15 |
| 4.25 | 5.40  |       |       |       |       |        |       |       |       |      |      |      |        |        |
| 40   | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00   | 0.00  | 0.00  | 0.00  | 0.00 | 0.00 | 0.00 | 0.00   | 0.00   |
|      | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00   | 0.00  | 0.00  | 0.00  | 0.00 | 0.00 | 0.00 | 0.00   | 0.00   |
|      | -2.82 | -3.21 | 14.29 | 21.53 | 27.44 | 10.26  | -0.96 | -4.40 | 0.00  | 0.00 | 0.00 | 0.00 | 0.00   | 0.00   |
|      | -0.08 | 13.99 |       |       |       |        |       |       |       |      |      |      |        |        |
| 41   | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00   | 0.00  | 0.00  | 0.00  | 0.00 | 0.00 | 0.00 | 0.00   | 0.00   |
|      | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00   | 0.00  | 0.00  | 0.00  | 0.00 | 0.00 | 0.00 | 0.00   | 0.00   |
|      | 0.00  | -2.91 | -1.39 | 15.34 | 20.52 | 12.06  | -0.17 | -3.08 | 0.00  | 0.00 | 0.00 | 0.00 | 0.00   | 0.00   |
|      | 0.00  | 0.00  |       |       |       |        |       |       |       |      |      |      |        |        |
| 42   | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00   | 0.00  | 0.00  | 0.00  | 0.00 | 0.00 | 0.00 | 0.00   | 0.00   |
|      | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00   | 0.00  | 0.00  | 0.00  | 0.00 | 0.00 | 0.00 | 0.00   | 0.00   |
|      | 0.00  | 0.00  | -2.28 | -2.87 | -3.12 | -3.17  | -3.22 | 0.00  | 0.00  | 0.00 | 0.00 | 0.00 | 0.00   | 0.00   |
|      | 0.00  | 0.00  |       |       |       |        |       |       |       |      |      |      |        |        |
| 43   | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00   | 0.00  | 0.00  | 0.00  | 0.00 | 0.00 | 0.00 | 0.00   | 0.00   |
|      | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00   | 0.00  | 0.00  | 0.00  | 0.00 | 0.00 | 0.00 | 0.00   | 0.00   |
|      | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00   | 0.00  | 0.00  | 0.00  | 0.00 | 0.00 | 0.00 | 0.00   | 0.00   |
|      | 0.00  | 0.00  |       |       |       |        |       |       |       |      |      |      |        |        |

DRAWDOWN WILL BE SAVED ON UNIT 82 AT END OF TIME STEP 1, STRESS PERIOD 1

VOLUMETRIC BUDGET FOR ENTIRE MODEL AT END OF TIME STEP 1 IN STRESS PERIOD 1

| CUMULATIVE VOLUMES | L**3        | RATES FOR THIS TIME STEP | L**3/T      |
|--------------------|-------------|--------------------------|-------------|
| -----              |             |                          |             |
| IN:                |             |                          |             |
| ---                |             |                          |             |
| STORAGE =          | 0.00000E+00 | STORAGE =                | 0.00000E+00 |
| CONSTANT HEAD =    | 0.00000E+00 | CONSTANT HEAD =          | 0.00000E+00 |
| WELLS =            | 0.00000E+00 | WELLS =                  | 0.00000E+00 |
| DRAINS =           | 0.00000E+00 | DRAINS =                 | 0.00000E+00 |
| RECHARGE =         | 0.97314E+07 | RECHARGE =               | 0.97314E+07 |
| RIVER LEAKAGE =    | 0.00000E+00 | RIVER LEAKAGE =          | 0.00000E+00 |
| TOTAL IN =         | 0.97314E+07 | TOTAL IN =               | 0.97314E+07 |
| OUT:               |             | OUT:                     |             |
| ---                |             | ---                      |             |

|                       |             |                       |             |
|-----------------------|-------------|-----------------------|-------------|
| STORAGE =             | 0.00000E+00 | STORAGE =             | 0.00000E+00 |
| CONSTANT HEAD =       | 0.00000E+00 | CONSTANT HEAD =       | 0.00000E+00 |
| WELLS =               | 0.28109E+07 | WELLS =               | 0.28109E+07 |
| DRAINS =              | 0.56408E+07 | DRAINS =              | 0.56408E+07 |
| RECHARGE =            | 0.00000E+00 | RECHARGE =            | 0.00000E+00 |
| RIVER LEAKAGE =       | 0.12797E+07 | RIVER LEAKAGE =       | 0.12797E+07 |
| TOTAL OUT =           | 0.97314E+07 | TOTAL OUT =           | 0.97314E+07 |
| IN - OUT =            | -1.0000     | IN - OUT =            | -1.0000     |
| PERCENT DISCREPANCY = | 0.00        | PERCENT DISCREPANCY = | 0.00        |

# TIME SUMMARY AT END OF TIME STEP 1 IN STRESS PERIOD 1

|                       | SECONDS | MINUTES | HOURS   | DAYS    | YEARS        |
|-----------------------|---------|---------|---------|---------|--------------|
| TIME STEP LENGTH      | 86400.0 | 1440.00 | 24.0000 | 1.00000 | 0.273785E-02 |
| STRESS PERIOD TIME    | 86400.0 | 1440.00 | 24.0000 | 1.00000 | 0.273785E-02 |
| TOTAL SIMULATION TIME | 86400.0 | 1440.00 | 24.0000 | 1.00000 | 0.273785E-02 |

## ATTACHMENT B. MODULAR MODEL POST-PROCESSOR RESULTS FROM A STEADY-STATE SIMULATION OF GROUND-WATER FLOW IN THE BLAINE AQUIFER, SOUTHWESTERN OKLAHOMA AND NORTHWESTERN TEXAS

U.S. GEOLOGICAL SURVEY MODULAR FINITE-DIFFERENCE GROUND-WATER MODEL  
STATISTICAL PRE- AND POST- PROCESSOR

BLAINE, 1N1AY, 43NROW, 47NCOL

BCF, RCH, SIP, OC

1 LAYERS = 1 ROWS = 43 COLUMNS = 47 NODES = 2021 STRESS PERIODS = 1

I/O UNITS:

[illegible]

LAYER AQUIFER TYPE

1 2

## DYNAMIC STORAGE UTILIZATION

|        |                    |
|--------|--------------------|
| 52053  | ELEMENTS ALLOCATED |
| 500000 | ELEMENTS AVAILABLE |

10.4% UTILIZED

447947 elements available for graphic storage

BOUNDARY ARRAY FOR LAYER 1 WILL BE READ ON UNIT 53 USING FORMAT: (47I2)

INITIAL HEAD FOR LAYER 1 WILL BE READ ON UNIT 73 USING FORMAT: (47F5.0)

AQUIFER HEAD SET EQUAL TO 0.00000E+00 AT ALL NO-FLOW NODES (IBOUND=0).

Heads available for reading on unit 84

Drawdown available for reading on unit 82

COLUMN TO ROW ANISOTROPY = 1.000000

**DELR = 5280.000**

DELC = 5280.000  
DEFAULT LAYER THICKNESS = 5280.000

TRANSMIS. ALONG ROWS FOR LAYER 1 WILL BE READ ON UNIT 93 USING FORMAT: (47G4.0)

TOP FOR LAYER 1 WILL BE READ ON UNIT 83 USING FORMAT: (47F7.1)

356 WELLS FOR CURRENT STRESS PERIOD

| LAYER | ROW | COL | STRESS RATE | WELL NO. |
|-------|-----|-----|-------------|----------|
| 1     | 14  | 29  | -18400.     | 1        |
| 1     | 14  | 30  | -18400.     | 2        |
| 1     | 14  | 36  | -18400.     | 3        |
| 1     | 14  | 37  | -18400.     | 4        |
| 1     | 14  | 38  | -18400.     | 5        |
| 1     | 15  | 28  | -18400.     | 6        |
| 1     | 15  | 29  | -18400.     | 7        |
| 1     | 15  | 30  | -18400.     | 8        |
| 1     | 15  | 31  | -18400.     | 9        |
| 1     | 15  | 36  | -18400.     | 10       |
| 1     | 15  | 37  | -18400.     | 11       |
| 1     | 15  | 38  | -18400.     | 12       |
| 1     | 15  | 39  | -18400.     | 13       |
| 1     | 16  | 20  | -18400.     | 14       |
| 1     | 16  | 21  | -18400.     | 15       |
| 1     | 16  | 22  | -18400.     | 16       |
| 1     | 16  | 28  | -18400.     | 17       |
| 1     | 16  | 29  | -18400.     | 18       |
| 1     | 16  | 30  | -18400.     | 19       |
| 1     | 16  | 31  | -18400.     | 20       |
| 1     | 16  | 35  | -18400.     | 21       |
| 1     | 16  | 36  | -18400.     | 22       |
| 1     | 16  | 37  | -18400.     | 23       |
| 1     | 16  | 38  | -18400.     | 24       |
| 1     | 16  | 39  | -18400.     | 25       |
| 1     | 17  | 20  | -18400.     | 26       |
| 1     | 17  | 21  | -18400.     | 27       |



|   |    |    |         |    |
|---|----|----|---------|----|
| 1 | 17 | 22 | -18400. | 28 |
| 1 | 17 | 23 | -18400. | 29 |
| 1 | 17 | 28 | -18400. | 30 |
| 1 | 17 | 29 | -18400. | 31 |
| 1 | 17 | 30 | -18400. | 32 |
| 1 | 17 | 31 | -18400. | 33 |
| 1 | 17 | 32 | -18400. | 34 |
| 1 | 17 | 35 | -18400. | 35 |
| 1 | 17 | 36 | -18400. | 36 |
| 1 | 17 | 37 | -18400. | 37 |
| 1 | 17 | 38 | -18400. | 38 |
| 1 | 17 | 39 | -18400. | 39 |
| 1 | 18 | 21 | -18400. | 40 |
| 1 | 18 | 22 | -18400. | 41 |
| 1 | 18 | 23 | -18400. | 42 |
| 1 | 18 | 24 | -18400. | 43 |
| 1 | 18 | 29 | -18400. | 44 |
| 1 | 18 | 30 | -18400. | 45 |
| 1 | 18 | 31 | -18400. | 46 |
| 1 | 18 | 32 | -18400. | 47 |
| 1 | 18 | 33 | -18400. | 48 |
| 1 | 18 | 34 | -18400. | 49 |
| 1 | 18 | 35 | -18400. | 50 |
| 1 | 18 | 36 | -18400. | 51 |
| 1 | 18 | 37 | -18400. | 52 |
| 1 | 18 | 38 | -18400. | 53 |
| 1 | 18 | 39 | -18400. | 54 |
| 1 | 18 | 40 | -18400. | 55 |
| 1 | 19 | 15 | -18400. | 56 |
| 1 | 19 | 16 | -18400. | 57 |
| 1 | 19 | 17 | -18400. | 58 |
| 1 | 19 | 18 | -18400. | 59 |
| 1 | 19 | 19 | -18400. | 60 |
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| 1 | 19 | 22 | -18400. | 62 |
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| 1 | 19 | 24 | -18400. | 64 |
| 1 | 19 | 30 | -18400. | 65 |
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| 1 | 19 | 34 | -18400. | 69 |
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| 1 | 19 | 36 | -18400. | 71 |
| 1 | 19 | 37 | -18400. | 72 |

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|---|----|----|---------|-----|
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| 1 | 19 | 40 | -18400. | 75  |
| 1 | 19 | 41 | -18400. | 76  |
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| 1 | 20 | 32 | -18400. | 87  |
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| 1 | 20 | 41 | -18400. | 96  |
| 1 | 20 | 42 | -18400. | 97  |
| 1 | 21 | 15 | -18400. | 98  |
| 1 | 21 | 16 | -18400. | 99  |
| 1 | 21 | 17 | -18400. | 100 |
| 1 | 21 | 18 | -18400. | 101 |
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| 1 | 21 | 39 | -18400. | 114 |
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| 1 | 21 | 41 | -18400. | 116 |

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| 1 | 40 | 34 | -18400. | 345 |
| 1 | 40 | 35 | -18400. | 346 |
| 1 | 40 | 36 | -18400. | 347 |
| 1 | 40 | 37 | -18400. | 348 |
| 1 | 40 | 38 | -18400. | 349 |
| 1 | 40 | 39 | -18400. | 350 |
| 1 | 41 | 33 | -18400. | 351 |
| 1 | 41 | 34 | -18400. | 352 |
| 1 | 41 | 35 | -18400. | 353 |
| 1 | 41 | 36 | -18400. | 354 |
| 1 | 41 | 37 | -18400. | 355 |
| 1 | 41 | 38 | -18400. | 356 |

----- RECHARGE WILL BE READ ON UNIT 91 USING FORMAT: (47F3.0) -----

BLAINE,1NLAY,43NROW,47NCOL  
 MODEL OF THE BLAINE AQUIFER, OKLAHOMA AND TEXAS  
 ANALYSIS OF HEAD DIFFERENCES

BCF,RCH,SIP,OC

Processing: READ HEAD 1 1 HEAD

READING : HEAD - HEAD  
 ON UNIT: 84  
 STRESS PERIOD 1  
 TIME STEP 1

THREE-DIMENSIONAL STACK CONTENTS AFTER READ COMMAND

| STACK    | DATA SET | STRESS TIME             |
|----------|----------|-------------------------|
| POSITION | NAME     | PERIOD STEP DESCRIPTION |



|   |      |   |        |
|---|------|---|--------|
| 4 |      | 0 | 0      |
| 3 |      | 0 | 0      |
| 2 |      | 0 | 0      |
| 1 | HEAD | 1 | 1 HEAD |

BLAINE, 1NLAY, 43NROW, 47NCOL  
 MODEL OF THE BLAINE AQUIFER, OKLAHOMA AND TEXAS  
 ANALYSIS OF HEAD DIFFERENCES

BCF, RCH, SIP, OC

Processing: MATH STRT - HEAD CHANGE CHANGE IN HEAD

COMPUTATION OF : CHANGE - CHANGE IN HEAD

FROM : STRT - INITIAL HEADS  
 ALL LAYER (S)

MINUS : HEAD - HEAD  
 ALL LAYER (S)  
 STRESS PERIOD 1  
 TIME STEP 1

TWO-DIMENSIONAL STACK CONTENTS AFTER MATH COMMAND

| STACK POSITION | DATA SET NAME | STRESS PERIOD | TIME STEP | DESCRIPTION |
|----------------|---------------|---------------|-----------|-------------|
|----------------|---------------|---------------|-----------|-------------|

|   |        |    |    |                |
|---|--------|----|----|----------------|
| 4 |        | -- | -- |                |
| 3 |        | -- | -- |                |
| 2 |        | -- | -- |                |
| 1 | CHANGE | -- | -- | CHANGE IN HEAD |

BLAINE, 1NLAY, 43NROW, 47NCOL  
 MODEL OF THE BLAINE AQUIFER, OKLAHOMA AND TEXAS  
 ANALYSIS OF HEAD DIFFERENCES

BCF, RCH, SIP, OC

DRAWDOWN AT ACTIVE NODES

Processing: STAT CHANGE 1

STATISTICS FOR : CHANGE - CHANGE IN HEAD  
ALL LAYER(S)

Masking was performed on CHANGE

1062 points remain out of 2021

959 points excluded that were inactive or constant head nodes

Zero or negative values present in matrix, therefore geometric and harmonic means were not computed

|                                       |                              |                             |                                  |  |                             |
|---------------------------------------|------------------------------|-----------------------------|----------------------------------|--|-----------------------------|
| ARITHMETIC<br>MEAN                    | ABSOLUTE VALUE<br>MEAN       | GEOMETRIC<br>MEAN           | HARMONIC<br>MEAN                 | ROOT MEAN<br>SQUARE                    | VARIANCE                    |
| 38.7408                               | 42.3073                      | 0.000000E+00                | 0.000000E+00                     | 60.3882                                | 2147.91                     |
| MINIMUM<br>-39.7338                   | MAXIMUM<br>238.304           | SUM OF<br>VALUES<br>41142.7 | STANDARD<br>DEVIATION<br>46.3455 | MEAN<br>DEVIATION<br>36.6103           | NUMBER OF<br>VALUES<br>1062 |
| COEFFICIENT<br>OF SKEWNESS<br>1.16790 | LOWER<br>QUARTILE<br>5.49042 | MEDIAN<br>23.8564           | UPPER<br>QUARTILE<br>63.9219     | NON-PARAMETRIC<br>SKEWNESS<br>0.371368 |                             |

| LOCATION  |     |              |
|-----------|-----|--------------|
| STATISTIC | ROW | COLUMN LAYER |
| MINIMUM   | 19  | 14 1         |

|         |    |    |   |                |
|---------|----|----|---|----------------|
| MAXIMUM | 11 | 9  | 1 |                |
| MEDIAN  | 21 | 33 | 1 |                |
| MEDIAN  | 23 | 34 | 1 | BCF,RCH,SIP,OC |

BLAINE,1NLAY,43NROW,47NCOL  
 MODEL OF THE BLAINE AQUIFER, OKLAHOMA AND TEXAS  
 ANALYSIS OF HEAD DIFFERENCES

# HISTOGRAM OF DRAWDOWN

Processing: HIST CHANGE 1

HISTOGRAM FOR : CHANGE - CHANGE IN HEAD  
 ALL LAYER(S)

Masking was performed on CHANGE

1062 points remain out of 2021

959 points excluded that were inactive or constant head nodes

User-specified classes requested, but have not been read; using 20 arithmetic computed classes

| CLASS | GREATER THAN | LESS THAN OR EQUAL TO | POPULATION |
|-------|--------------|-----------------------|------------|
| 1     |              | -39.7338              | 1.         |
| 2     | -39.7338     | -24.2872              | 24.        |
| 3     | -24.2872     | -8.84063              | 43.        |
| 4     | -8.84063     | 6.60594               | 219.       |
| 5     | 6.60594      | 22.0525               | 219.       |
| 6     | 22.0525      | 37.4991               | 139.       |
| 7     | 37.4991      | 52.9456               | 86.        |
| 8     | 52.9456      | 68.3922               | 89.        |
| 9     | 68.3922      | 83.8388               | 72.        |
| 10    | 83.8388      | 99.2853               | 55.        |
| 11    | 99.2853      | 114.732               | 26.        |
| 12    | 114.732      | 130.178               | 22.        |

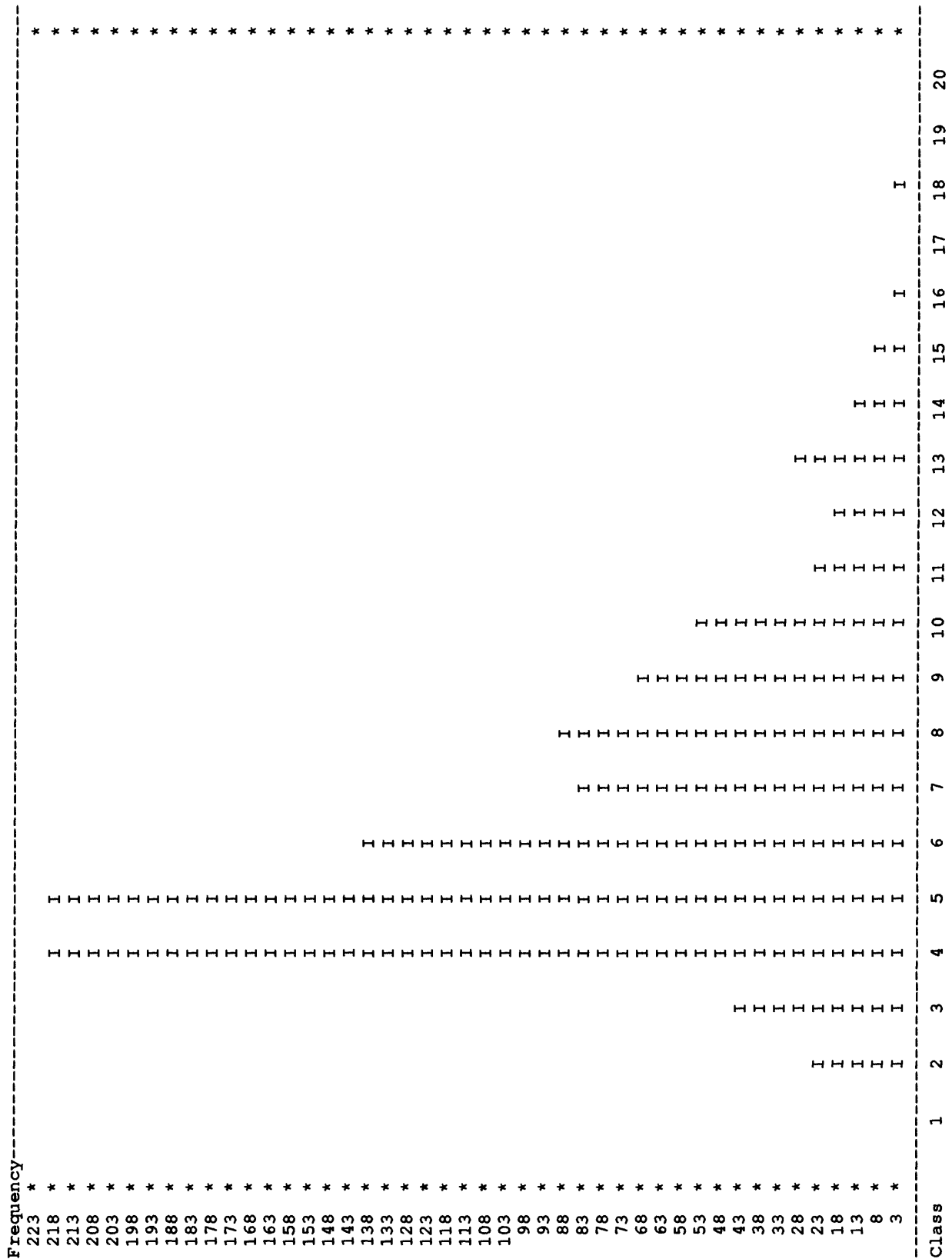
29.  
16.  
10.  
6.  
2.  
3.  
1.  
0.

145.625  
161.072  
176.518  
191.965  
207.411  
222.858  
238.304

130.178  
145.625  
161.072  
176.518  
191.965  
207.411  
222.858  
238.304

13  
14  
15  
16  
17  
18  
19  
20

# HISTOGRAM



HISTOGRAM FOR : CHANGE - CHANGE IN HEAD  
ALL LAYER(S)

MODULAR GROUND-WATER MODEL STATISTICAL PROCESSING TERMINATING NORMALLY

6 COMMANDS EXECUTED

6 COMMANDS READ

# ATTACHMENT C. ZONEBUDGET RESULTS FOR A STEADY-STATE SIMULATION OF GROUND-WATER FLOW IN THE BLAINE AQUIFER, SOUTHWESTERN OKLAHOMA AND NORTHWESTERN TEXAS

ZONEBUDGET version 1.00

Program to compute a flow budget for subregions of a model using cell-by-cell flow data from the USGS Modular Ground-Water Flow Model.

The cell-by-cell budget file is:  
budget

1 layers            43 rows            47 columns

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The zone file is:  
zone.data

Zone Array for layer 1 will be read from the Zone File  
Zone Array for layer 1 will be read using format: (47I2)

-----  
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Flow Budget for Zone 2 at Time Step 1 of Stress Period 1  
-----

| Budget Term           | Flow (L**3/T) |
|-----------------------|---------------|
| -----                 |               |
| IN:                   |               |
| ---                   |               |
| CONSTANT HEAD =       | 0.00000E+00   |
| WELLS =               | 0.00000E+00   |
| DRAINS =              | 0.00000E+00   |
| RECHARGE =            | 0.35702E+06   |
| RIVER LEAKAGE =       | 0.00000E+00   |
| Zone 0 to 2 =         | 0.14425E+07   |
| Zone 9 to 2 =         | 0.00000E+00   |
| Total IN =            | 0.17996E+07   |
| OUT:                  |               |
| ----                  |               |
| CONSTANT HEAD =       | 0.00000E+00   |
| WELLS =               | 0.00000E+00   |
| DRAINS =              | 0.13408E+07   |
| RECHARGE =            | 0.00000E+00   |
| RIVER LEAKAGE =       | 0.00000E+00   |
| Zone 2 to 0 =         | 0.42488E+06   |
| Zone 2 to 9 =         | 33865.        |
| Total OUT =           | 0.17996E+07   |
| IN - OUT =            | -0.46936      |
| Percent Discrepancy = | 0.00          |

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Flow Budget for Zone 3 at Time Step 1 of Stress Period 1

```
-----
      Budget Term      Flow (L**3/T)
      -----
IN:
---
      CONSTANT HEAD = 0.00000E+00
          WELLS = 0.00000E+00
          DRAINS = 0.00000E+00
          RECHARGE = 2587.1
      RIVER LEAKAGE = 0.00000E+00
      Zone 0 to 3 = 9685.1

      Total IN = 12272.

OUT:
----
      CONSTANT HEAD = 0.00000E+00
          WELLS = 0.00000E+00
          DRAINS = 12274.
          RECHARGE = 0.00000E+00
      RIVER LEAKAGE = 0.00000E+00
      Zone 3 to 0 = 0.00000E+00

      Total OUT = 12274.

      IN - OUT = -1.9126

      Percent Discrepancy = -0.02
```



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Flow Budget for Zone 4 at Time Step 1 of Stress Period 1

---

| Budget Term | Flow (L**3/T) |
|-------------|---------------|
|-------------|---------------|

---

IN:

---

|               |   |             |
|---------------|---|-------------|
| CONSTANT HEAD | = | 0.00000E+00 |
| WELLS         | = | 0.00000E+00 |
| DRAINS        | = | 0.00000E+00 |
| RECHARGE      | = | 18110.      |
| RIVER LEAKAGE | = | 0.00000E+00 |
| Zone 0 to 4   | = | 13812.      |

Total IN = 31921.

OUT:

----

|               |   |             |
|---------------|---|-------------|
| CONSTANT HEAD | = | 0.00000E+00 |
| WELLS         | = | 0.00000E+00 |
| DRAINS        | = | 0.00000E+00 |
| RECHARGE      | = | 0.00000E+00 |
| RIVER LEAKAGE | = | 0.00000E+00 |
| Zone 4 to 0   | = | 31921.      |

Total OUT = 31921.

IN - OUT = -0.18723E-01

Percent Discrepancy = 0.00

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Flow Budget for Zone 5 at Time Step 1 of Stress Period 1

---

| Budget Term           | Flow (L**3/T) |
|-----------------------|---------------|
| <hr/>                 |               |
| IN:                   |               |
| ---                   |               |
| CONSTANT HEAD =       | 0.00000E+00   |
| WELLS =               | 0.00000E+00   |
| DRAINS =              | 0.00000E+00   |
| RECHARGE =            | 18757.        |
| RIVER LEAKAGE =       | 0.00000E+00   |
| Zone 0 to 5 =         | 0.41554E+06   |
| Total IN =            | 0.43429E+06   |
| OUT:                  |               |
| -----                 |               |
| CONSTANT HEAD =       | 0.00000E+00   |
| WELLS =               | 0.00000E+00   |
| DRAINS =              | 0.35026E+06   |
| RECHARGE =            | 0.00000E+00   |
| RIVER LEAKAGE =       | 0.00000E+00   |
| Zone 5 to 0 =         | 84047.        |
| Total OUT =           | 0.43431E+06   |
| IN - OUT =            | -15.364       |
| Percent Discrepancy = | 0.00          |

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Flow Budget for Zone 6 at Time Step 1 of Stress Period 1

```
-----
      Budget Term      Flow (L**3/T)
      -----
IN:
---
      CONSTANT HEAD = 0.00000E+00
            WELLS = 0.00000E+00
            DRAINS = 0.00000E+00
            RECHARGE = 0.35767E+06
      RIVER LEAKAGE = 0.00000E+00
      Zone 0 to 6 = 0.14993E+07

      Total IN = 0.18569E+07

OUT:
----
      CONSTANT HEAD = 0.00000E+00
            WELLS = 0.17210E+06
            DRAINS = 0.15807E+07
            RECHARGE = 0.00000E+00
      RIVER LEAKAGE = 0.00000E+00
      Zone 6 to 0 = 0.10420E+06

      Total OUT = 0.18570E+07

      IN - OUT = -62.565

Percent Discrepancy = 0.00
```

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Flow Budget for Zone 7 at Time Step 1 of Stress Period 1

| Budget Term           | Flow (L**3/T) |
|-----------------------|---------------|
| IN:                   |               |
| ---                   |               |
| CONSTANT HEAD =       | 0.00000E+00   |
| WELLS =               | 0.00000E+00   |
| DRAINS =              | 0.00000E+00   |
| RECHARGE =            | 0.42041E+06   |
| RIVER LEAKAGE =       | 0.00000E+00   |
| Zone 0 to 7 =         | 0.29930E+07   |
| Zone 10 to 7 =        | 0.00000E+00   |
| Total IN =            | 0.34134E+07   |
| OUT:                  |               |
| ----                  |               |
| CONSTANT HEAD =       | 0.00000E+00   |
| WELLS =               | 0.20488E+06   |
| DRAINS =              | 0.17387E+07   |
| RECHARGE =            | 0.00000E+00   |
| RIVER LEAKAGE =       | 0.00000E+00   |
| Zone 7 to 0 =         | 0.14275E+07   |
| Zone 7 to 10 =        | 42360.        |
| Total OUT =           | 0.34134E+07   |
| IN - OUT =            | 12.529        |
| Percent Discrepancy = | 0.00          |

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Flow Budget for Zone 8 at Time Step 1 of Stress Period 1

---

| Budget Term           | Flow (L**3/T) |
|-----------------------|---------------|
| <hr/>                 |               |
| IN:                   |               |
| ---                   |               |
| CONSTANT HEAD =       | 0.00000E+00   |
| WELLS =               | 0.00000E+00   |
| DRAINS =              | 0.00000E+00   |
| RECHARGE =            | 84081.        |
| RIVER LEAKAGE =       | 0.00000E+00   |
| Zone 0 to 8 =         | 0.71522E+06   |
| Total IN =            | 0.79930E+06   |
| OUT:                  |               |
| -----                 |               |
| CONSTANT HEAD =       | 0.00000E+00   |
| WELLS =               | 40975.        |
| DRAINS =              | 0.61129E+06   |
| RECHARGE =            | 0.00000E+00   |
| RIVER LEAKAGE =       | 0.00000E+00   |
| Zone 8 to 0 =         | 0.14703E+06   |
| Total OUT =           | 0.79929E+06   |
| IN - OUT =            | 8.2062        |
| Percent Discrepancy = | 0.00          |

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Flow Budget for Zone 9 at Time Step 1 of Stress Period 1

| Budget Term           | Flow (L**3/T) |
|-----------------------|---------------|
| IN:                   |               |
| ---                   |               |
| CONSTANT HEAD =       | 0.00000E+00   |
| WELLS =               | 0.00000E+00   |
| DRAINS =              | 0.00000E+00   |
| RECHARGE =            | 0.24254E+06   |
| RIVER LEAKAGE =       | 0.00000E+00   |
| Zone 0 to 9 =         | 0.64361E+06   |
| Zone 2 to 9 =         | 33865.        |
| Zone 10 to 9 =        | 0.00000E+00   |
| Total IN =            | 0.92002E+06   |
| OUT:                  |               |
| ----                  |               |
| CONSTANT HEAD =       | 0.00000E+00   |
| WELLS =               | 0.00000E+00   |
| DRAINS =              | 0.00000E+00   |
| RECHARGE =            | 0.00000E+00   |
| RIVER LEAKAGE =       | 0.78949E+06   |
| Zone 9 to 0 =         | 0.11779E+06   |
| Zone 9 to 2 =         | 0.00000E+00   |
| Zone 9 to 10 =        | 12725.        |
| Total OUT =           | 0.92001E+06   |
| IN - OUT =            | 8.8111        |
| Percent Discrepancy = | 0.00          |

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Flow Budget for Zone 10 at Time Step 1 of Stress Period 1

| Budget Term           | Flow (L**3/T) |
|-----------------------|---------------|
| IN:                   |               |
| ---                   |               |
| CONSTANT HEAD =       | 0.00000E+00   |
| WELLS =               | 0.00000E+00   |
| DRAINS =              | 0.00000E+00   |
| RECHARGE =            | 0.19403E+06   |
| RIVER LEAKAGE =       | 0.00000E+00   |
| Zone 0 to 10 =        | 0.26808E+06   |
| Zone 7 to 10 =        | 42360.        |
| Zone 9 to 10 =        | 12725.        |
| Total IN =            | 0.51719E+06   |
| OUT:                  |               |
| ----                  |               |
| CONSTANT HEAD =       | 0.00000E+00   |
| WELLS =               | 16390.        |
| DRAINS =              | 0.00000E+00   |
| RECHARGE =            | 0.00000E+00   |
| RIVER LEAKAGE =       | 0.49021E+06   |
| Zone 10 to 0 =        | 10570.        |
| Zone 10 to 7 =        | 0.00000E+00   |
| Zone 10 to 9 =        | 0.00000E+00   |
| Total OUT =           | 0.51717E+06   |
| IN - OUT =            | 20.188        |
| Percent Discrepancy = | 0.00          |

